SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2140.—VOL. XLVI. LONDON, SATURDAY, AUGUST 26, 1876. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

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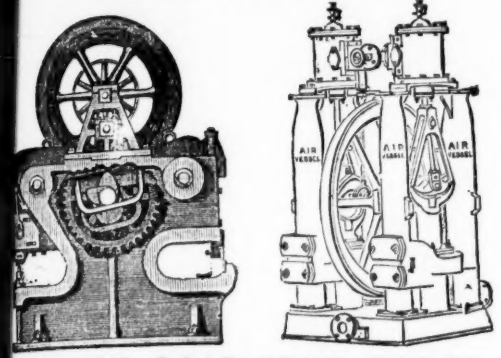

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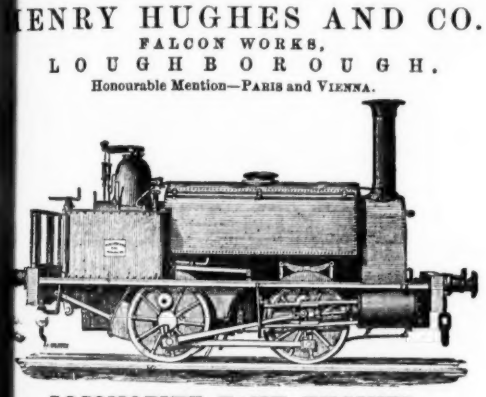

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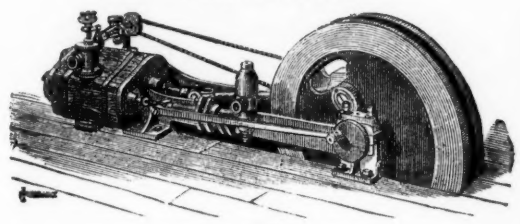

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CATALOGUES & ESTIMATES ON APPLICATION.

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WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is not much short of 10 per cent."

GRENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

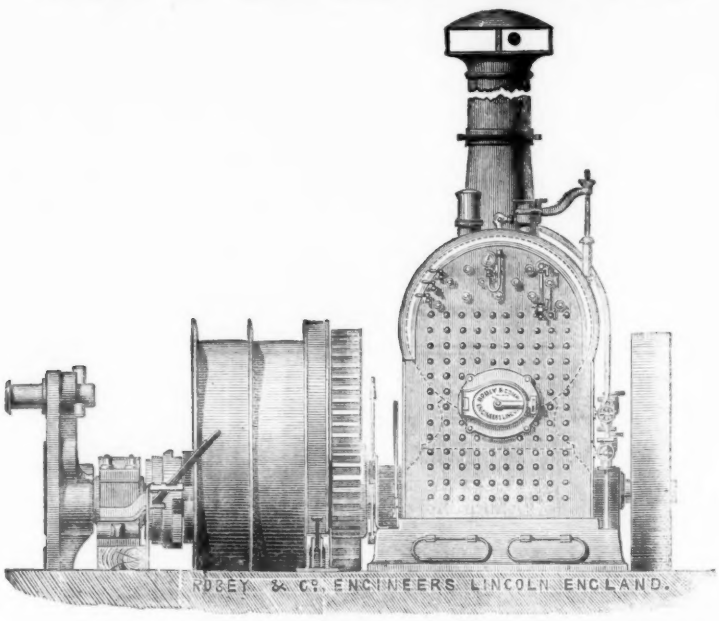
Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

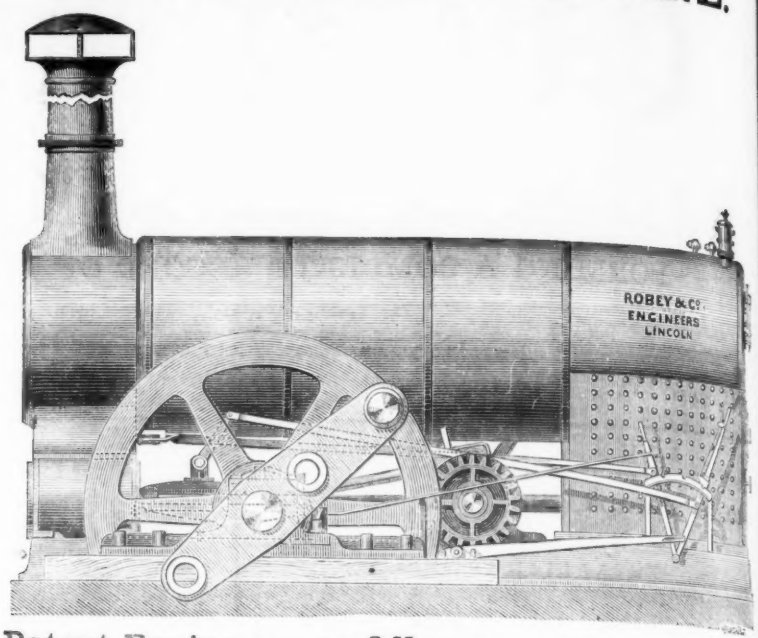
Mr. C. DODSWORTH says—"It is the very best for the purpose and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

Drawings, specifications, and estimates will be forwarded on application to—
GEORGE GREEN, M.E., ABERYSTWITH, SOUTH WALES

Patent No. 4136 - - - - - - Dated 16th December, 1873.
Patent No. 4150 - - - - - - Dated 17th December, 1873.

THE PATENT IMPROVED ROBEY MINING ENGINE.





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This New Patent Engine is free from all the objections that can be urged against using the old style of Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable, in saving time and expense in fixing.

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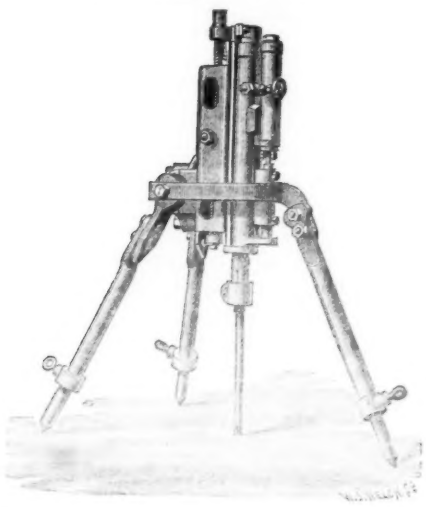

Intending purchasers can satisfy themselves that the advantages claimed for the "CHAMPION" over all other Rock Borers are not over-estimated.

For the amount of work it will do, it is the lightest, most compact, most durable, and cheapest in the market.

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And other MINING MACHINERY.

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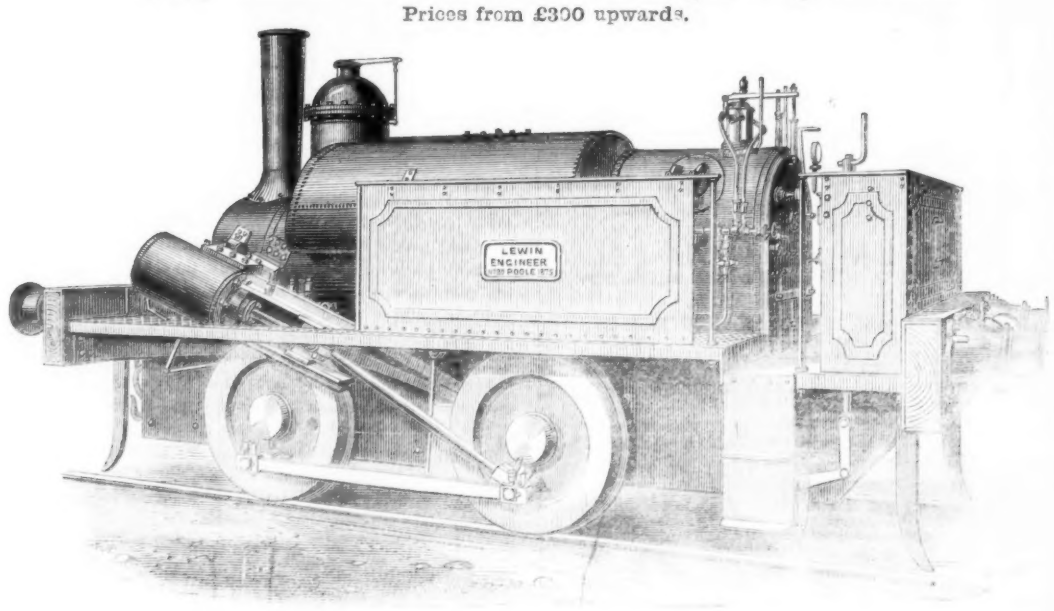

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Original Correspondence.

THE ARUBA ISLAND GOLD MINING COMPANY (LIMITED).

Sir,—A twenty-page pamphlet, dated Aug. 11, has been issued from the office of the above company, and addressed "To the share and debenture holders," soliciting "subscriptions for a second issue of 10,000*l.* bonds, bearing interest at the rate of 10 per cent. per annum." This appeal embodies a statement from the Chairman; a letter from Benjamin F. Rule, "Manager of the company at Aruba;" "an estimate of working expenses;" a "statement of the sum necessary to complete and start the machinery;" a "statement showing the whole amount of ore crushed," and some other matters of lesser importance.

The Chairman briefly sets forth some prominent facts concerning the company's operations and the situation, and says:—"The present board summoned Mr. Rule, the Manager at the Island, to London. They then instituted a searching enquiry into the gold wealth of the Island, and the causes of past failure;* and, after stating that the estimates made by Mr. Rule were "supervised by the directors," we have the following:—"Great care has been taken to reckon every conceivable expenditure, and not to over-estimate the yield of gold. If we take the actual yield of the various lots of ore which have been worked by the company since its organisation, and Mr. Taylor's report made previous to the formation of the company, it follows that Mr. Rule's estimate of 15 dwts. per ton can be relied on. Mr. Rule declares himself certain that the estimated profit of over 20,000*l.* (after paying 10 per cent. interest on 20,000*l.* bonds), based on a present expenditure of 8000*l.*, is not over-stated by him."

On the concluding page the Chairman says:—"The errors of the past must be avoided, and the affairs of the company in the future be conducted with efficiency and economy; and the immediate co-operation of all interested is earnestly solicited."

In Mr. Rule's letter to the directors he says—"I have carefully reckoned the expenses necessary to treat 50 tons of ore per day, or 1200 tons per month. In regard to the yield of gold, I have estimated it at an average of 15 dwts. per ton of ore crushed; this is based upon the fact that I have worked a large quantity of dump (surface) and refuse ore, which produced 10 dwts. to the ton."

Being one of those "interested," and possibly the only one posted in mining affairs who has also personally visited and examined the Island, I propose a brief review of this appeal for the benefit of those share and debenture holders who have no means of information other than such as this and kindred appeals vouchsafe—information, estimates, and statements deliberately prepared.

1.—With reference to the "causes of past failures." Mr. Benjamin F. Rule was the "Superintendent and Mining Engineer" of the Messrs. Rickett, the former owners and vendors of the concession. Under his management the property was prepared for the London market by prospecting many mines, and limitedly working nine, from which 21,139 tons of ore were claimed to have been produced. The whole of the ores were spalled so as to select therefrom the richest for shipment. The mining and spalling cost 7*l.* per ton of ore shipped, which latter was in amount less than 5 per cent. of the 21,139 tons. The shipped ores were treated at Greenville, United States, the gross yield amounting to 10*l.* 10s. per ton (excepting the yield of 23½ tons); the balance, 20,250 tons, remained at the mines.

Under the date of "Aruba Island, West Indies, April 15, 1872," Mr. Benjamin F. Rule wrote a report for the vendors and promoters, which was published in Mr. Frank Taylor's general report on pages 12, 13, 14, 15, and 16. Of the above ores he then said—"I cannot estimate the value of the ores per ton, as none of them have been treated here, but the average of about 900 tons shipped to Greenville, United States, for treatment was 16*l.* 6s. per ton.

The Greenville table of results is found on p. 70 of Mr. Taylor's report, in which only one lot of ore is described as ("selected ore") 23½ tons. Inference—the balance not selected; when the fact was that the whole 21,239 tons had been spalled in order to "select" therefrom 889 tons, which yielded 5*l.* 16s. less per ton than the yield stated by Mr. Rule.

Mr. Rule in this way encouraged the inference that the 20,250 tons, described by him as "now at mine," were such as those treated at Greenville (excepting 23½ tons), and which, according to his statement, yielded 16*l.* 6s. per ton. Of these same ores he now says, under date of London, June 17, 1876—"I have worked a large quantity of dump (surface) and refuse ore, which produced 10 dwts. to the ton" (value, 1*l.* 10s. per ton). The same expert who, by suppression and suggestion encouraged the inference in 1872, that the ores, 20,250 tons, "now at mine," yielded 16*l.* 6s. per ton, in 1876 terms them "dump (surface) and refuse ores," yielding 1*l.* 10s. per ton.

In consequence of Mr. Rule's report of 1872 a costly mill of limited capacity for working the high-grade ores "now at mine" was sent out and erected, the motive power (windmills) also in pursuance of his advice. Mr. Rule left the island. His successor commenced operations on the ores "now at mine." The first results sent to London reads, "19¾ tons unselected, 8 dwts. 21 grs.;" value per ton 1*l.* 5s. Up to December, 1874, less than 300 tons of selected ore could be procured and milled. Mr. Neuman failed, and returned to London. Mr. Rule was then on hand, and was sent out to finish the erections and work out his former statements, the means supplied by an issue of 10,000*l.* debentures. His first returns, aggregated, reads, "323¾ tons dump ore unselected, 8 dwts. 5 grs.," not 10 dwts., as stated by Mr. Rule; value per ton 1*l.* 4s. Mr. Rule failed, and returned to London, summoned by the present board, and his salary continued, in order that "the errors of the past may be avoided, and the affairs of the company in the future be conducted with efficiency and economy." Mr. Rule mines successfully—in London!

2.—With regard to "great care has been taken not to over-estimate the yield of gold," Mr. Rule's estimate is—"At an average of 15 dwts. per ton, 1200 tons (monthly) will yield 900 ozs. of gold per month, and this valued at 3*l.* 10s. per ounce will amount to 3150*l.* per month, or per year to 37,800*l.* The estimate of 15 dwts. per ton "is based upon the fact that I have worked a large quantity of dump (surface) and refuse ore (part of the 20,250 tons now at mine) which produced 10 dwts. per ton. Of this "large quantity," actually only 500 tons, 323 tons yielded in London 8 dwts. 5 grs., worth 3s. per pennyweight, or 1*l.* 4s. 2d. per ton. The ounce, therefore, is wrongly valued at 3*l.* 10s.; it is worth only 3*l.* on Mr. Rule's own basis.

(*a.*) Granting the yield on Mr. Rule's basis to be 15 dwts per ton, the pennyweight being worth 3s., then the 1200 tons would be worth 2700*l.*, equal to 32,400*l.* yearly.

(*b.*) But the value of the pennyweight "of the actual yield of the various lots of ore which have been worked by the company (the Chairman's words) since its organisation," is only 2s. 7d. Hence, "supervised by the directors," the total yield should be 27,900*l.*

(*c.*) Then taking another authority relied upon by the Chairman and the supervising directors—Claudet's assays (figured out by me and appropriated by Mr. Rule) at 15 dwts. per ton, we have a yield of gold worth 2*l.* per ton. Since the working yield is never beyond two-thirds of the assay value of sulphuretted ores, often only 40 per cent., as in Colorado. Hence we should have 2*l.* per ton, or 28,800*l.*

(*d.*) The 21,139 tons represent the ores of Aruba as raised from the mines. The Greenville return of the select, and Rule's work, result of 10 dwts. for 500 tons of the remaining 20,250 tons, again gives 2*l.* per ton. Hence the working value of 1200 tons monthly, or 28,800*l.* yearly. Strange that the supervising directors did not supervise Mr. Rule's estimates, "as great care has been taken not to overestimate the yield of gold."

OVER-ESTIMATE CONTRASTED WITH SAFE ESTIMATES.

Mr. Rule's over-estimate, "supervised by directors"	£37,800	per year.
(*a*).—Corrected on his working basis of 15 dwts. per ton ...	32,400	,,
(*b*).—Value of dwt. whole yield, working basis	27,900	,,
(*c*).—Value as per Claudet's assays, working results two-thirds	28,800	,,
(*d*).—Value based upon Greenville and Rule (21,139 tons) ...	28,800	,,

No expert capable of getting at the true figures, and in any moral way responsible for his accuracy, would estimate the product of 14,400 tons of Aruba ore as raised from the mines, according to every line of past experience, beyond 2*l.* per ton working value, or 28,800*l.* for the year, milling 14,400 tons.

3.—With reference to "average monthly expenses." These are comprised in eleven items:—1. Salaries at Aruba.—2. Office expenses, London.—3. Aruba—aggregate, 2786*l.* per annum, 3s. 9½d. per ton of ore; an extravagant cost, fully one-third beyond what should be paid.—4. 200 native labourers mining, milling, transporting ores, and watchmen, at 1s. 2d. per day, 350*l.* per month, or 5s. 10d. per ton of ore. After six months' development nothing is estimated for dead work, sinking shafts, running levels, timbering, and mining captains' wages—and very much of this 1s. 2d. per day for native labourers is only paper and prospectus talk. The working of five mines in the small way for 50 tons daily will aggregate a cost of 10s. per ton, carriage and milling included, for labour alone.—5. The consumption of coal is understated for the 24 hours run per day, and delivered at the works it has cost more than 3*l.* per ton.—7. Powder and fuse for blasting is stated at 15s. per day, or 3 3-5d. per ton—a palpable absurdity. The native labourers will waste more than this allowance per ton of rock blasted; the estimate should not be less than 10d. per ton.—9. Quicksilver, 960*l.* per annum, or 1s. 4d. per ton. The loss of quicksilver heretofore has been from four to five times more than this, and the same will again be the case with the grinding pans. No safe estimate can possibly be made at less than 3s. per ton for the loss of quicksilver.—10. "Wear and tear of machinery," 6d. per ton of ore. California experience rates this cost at 1s. per ton of ore crushed in stamp mill. Grinding pans double this cost. The shoes and dies sent to Aruba for the 20 stamps and 4 grinding pans were exhausted in crushing and grinding some 800 tons. If Mr. Rule's estimate is correct, only 20*l.* of shoes and dies accompanied machinery costing 20,000*l.* No safe estimate can be made at less than 2s. per ton of ore crushed.

The estimate at 16s. 8d. per ton should be 1*l.* 4s. 7d. per ton, and in all likelihood that cost will be exceeded the first year of working—1500*l.* instead of 1000*l.* per month.

Fairly and roundly stated, 12,000 tons of ore may be raised and treated the first year after the proposed machinery is in operation. Every fact of the past affirms in the most positive way that the working yield should not be estimated beyond 2*l.* per ton=24,000*l.* the first year. The working expenses, duties, freight, insurance, &c., 16,000*l.*, leaving a possible profit of less than 5000*l.*, instead of the extravagant profit of over 20,000*l.*

Touching the estimates for erecting the machinery—I regard the statement, as a whole and in detail, as most unsatisfactory; as per example, the fifth month—"150 native miners bringing ore to mill at 1s. 2d. per day."—Sixth month: "200 native labourers getting ore to mill, and assist in mill day and night at 1s. 2d. per day." As a blind, it may serve the purpose intended.

The machinery is not such as should be erected in Aruba; it is unsuited for working in the large way economically, and should it prove unprofitable in the small way, the whole outlay will be a loss.

York-street, St. James's, London, Aug. 23. G. W. Baker.

* Before this appeal was prepared the Chairman and directors were informed by a printed circular of the real causes of the past failures. Share and debenture holders who have not received this circular may address me as above for a copy by post.

PACIFIC COAST MINING NOTES—No. VI.

THE COMSTOCK AND ITS SURROUNDINGS.

Sir,—As the underwritten date line will indicate, I write this letter from no obscure locality, devoid of interesting data or name. The Comstock has already become a household word; its name and fame have long ago spread to every clime where the mobile metals are known and appreciated. But at no period since its first mining claim was located and recorded has the value and quantity of its metallic product been more closely watched, estimated, and commented on than at the present juncture. The reason for this attention is obvious enough at present in view of the 25 per cent. discount on the silver extracted from its profound depths. Every pen, too, journalistic and otherwise, has for months past been vigorously employed in giving currency to the reported estimates that have been made of its capacity for production. These partially coloured stories doubtless have had not a little to do in fixing the present status of at least one of the precious metals. But those persons who dwell at a distance, and have never inspected the great fissure, can form no correct idea of its mineral resources and wealth. The former are apparently unbounded, but the future alone can only determine to what extent these promises will be borne out. The future outlook, at all events, is a promising one, and without all the indications upon which mining men, experts, and mineralogists generally depend for a realisation of their opinions should prove unreliable, the great lode will continue to sustain the reputation it has won. The monthly dividends are still being punctually dispersed to shareholders, and these will always be looked upon as the best proof that can be given of the productiveness of its mines.

The bullion product of one of the bonanza mines—the California—for the months of April, May, June, and July up to the 22nd inst., aggregated $5,450,699·43. These figures exhibit substantial facts. I also find, from an examination of some reliable statistics, that the annual net yield of the Comstock range approximates $22,000,000, which is disbursed in dividends; and I learn from the same authentic source that the product of the whole State to date is computed at $300,000,000. Comparing this return with the yield of the Veta Madre, or great mother vein, and some few other less noted mines of Mexico, which were worked for a period of more than 280 years, we cannot fail being lost in astonishment at the fruitfulness of Nevada, whose mineral discoveries do not date further back than 1858. The Mexican mines, for a space covering 280 years, gave a yield of less than $720,000,000. The Cerro del Potoso of Bolivia, too, the richest mine of South America, produced not more than $5,000,000 annually for 250 years. From but two claims on this lode, whose hoisting works are within hailing distance of where I write, there were $50,000,000 extracted inside of three years, $20,000,000 of which sum found their way into the pockets of shareholders, and their united lineal extent do not exceed 1480 ft., and what is even more, they yet stand *nil* among the bullion producing mines of the district.

The discovery of the Comstock was purely accidental, and its history dates only from June, 1859, but surface gold was found near where Virginia City now stands the year previous by a couple of adventurous prospectors, who at that comparatively early day were but little skilled as "rock sharps." They were not on the look out for silver or other veins at the time, but quietly and intently bent on excavating a shallow hole to hold water for the use of their rockers, and when they found at the bottom of their circular pit the rich, heavy sulphurets of silver, they did not know what to think of it, so little did they understand its nature or value, and it is probable that they would have thrown it aside with the remainder of the debris as worthless stuff, had they not discovered mixed up with it and the clay they had already shovelled out no small quantity of coarse face gold shining in all its virgin purity before their astonished gaze. This article they appreciated, but the "black stuff" puzzled them completely, but they were not allowed to remain long in doubt regarding its name and value, for the fame of their "find" soon becoming noised around attracted the attention of others who, subjecting the mysterous black stuff to a critical examination, quickly pronounced it the rich sulphurets of silver. Thereupon followed a lively scramble for choice locations, and shortly after a grand rush from California set in, which thus established the future of Washo district, by which name it was and is yet known.

Subsequent to the foregoing interesting occurrences, Henry P. Comstock, the man whose name the great lode has rescued from obscurity, appeared upon the theatre of operations just in time to become a prominent actor in the struggle then pending among the locators of the claims that had been previously staked off. Comstock, who was an old resident and prospector, like themselves, and known to all the parties interested in the question then at issue, managed to have himself elected to the position of umpire. Being thus installed in his new office, he quietly heard the evidence *pro* and *con*, and after mature reflection, not being able to adjust matters to his satisfaction, and, perhaps, not to the satisfaction of those most deeply interested, he proposed to settle the whole thing by buying the disputed piece of ground from the party whose claim to it seemed to be the strongest. This novel method of adjudication, instead of meeting with opposition, was received with cheers from all present, including the owner of the ground, which, by a singular piece of luck, covered the now celebrated California and Consolidated Virginia Mines. This same claim was sold the year following for above a million dollars in Uncle Sam's double eagles. But the unfortunate Comstock, whose remains now repose in a 6 by 8 ft. plot somewhere within the confines of Montana, was not destined to reap any of the golden harvest thus gathered in, for almost before he had taken possession of his peculiarly acquired property he had sold it for a spavined Indian pony, a gallon of whisky, and some other creature comforts, such as tobacco, &c., which these early pioneers esteemed above all things else. But though he derived no greater benefit from his claim than what has been just recorded, he had the satisfaction of having his name associated with the lode and range whose fame shall transmit it to the latest posterity. The ground to be conveyed was unnamed, and for the want of a better one it was described in the deed as the Comstock claim or ground, and thus was it baptised amidst convivial greetings and the quaffing of innumerable bumpers of exhilirating Bourbon. The bibulous propensities of the Washoetes of the present era are well known, and are frequently rather severely commented on by the cold water brigade, whose influence after all is not quite so potent as they would have us believe. Cold water has its virtues as well as its admirers, but to tell the truth the advocates of a resort to the pure sparkling fountains of Nature appear to be in the minority hereabouts. However, intemperance is not more rife than elsewhere throughout the Union, except among that large class of do-nothings who lead a precarious existence, drones of society whose misfortune it is to be alwaye apparently undergoing the tortures of Tantalus. J. D. Power.

Virginia City, Nevada, July 27.

MINING IN QUEENSLAND.

Sir,—Since my last mining matters have been steady, and progressing quietly. In Northern Queensland the gold export is increasing steadily; the reefs at the Palmer and on the new rush are reported very good, and so soon as machinery can be got on the ground some of these splendid reefs will be made to yield their treasure. The alluvial has turned out poor so far, but there is no doubt an extensive alluvial digging is yet to be discovered in the district; the country is honeycombed with rich golden reefs.

In Copper there is little doing; a report is current that some of our rich deposits of this metal are to be worked, but until we get railway extension between the several copper districts and the shipping it is hopeless to expect any development of this mineral. As we have no private enterprise amongst us for railway making, the work remains for the Government of the colony to accomplish, and it will at last, years hence maybe, be moved by some political dodge or another.

In Tin everything is very quiet. The quantity forwarded from the Warwick Railway Station during the month of April was as follows:

	Tons.	cwts.	qr.	lbs.
Stream tin	309	18	1	20
Ingot tin	7	17	1	12
Total	317	15	3	4

Showing a falling off of over 50 tons on either February or March, and over 60 tons less than April, 1875. As for local news I cannot do better than request you to reprint the enclosed slip; it will give your readers much information. Resident.

Brisbane, June 17.

Tin Mining.—The culpable indifference exhibited by the New South Wales Government in regard to the forfeited mineral lands of that colony is a serious impediment to mining progress immediately across the Border, where thousands of acres, to all intents and purposes forfeited by the original selectors, lie dormant, and entirely locked up from the miner, through the apathy of the Government in publicly declaring the forfeitures in a more comprehensive manner. As things stand at present, the individual miner in search of tin ground has no means of ascertaining what portions are or are not available for re-selection, and wherever he "sets in," runs the risk of being ordered off should he come upon anything payable, by someone in all probability no more entitled to the ground than he himself. Many instances of this nature have come under our personal notice, and although not strictly conversant with the provisions of the New South Wales mineral land laws, we have no hesitation in saying that the regulations relating to occupation, &c., have in some instances been most disgracefully violated. How is it that upon the discovery of payable tin by the unfortunate "fossicker"—though would-be selector—the original holder, whose right, title, and interest had long since expired through effluxion of time, should be permitted to resume possession by the payment of back arrears—which he never intended to have done but for the circumstance referred to? Yet we are credibly informed that such cases have occurred. And even the land which is legitimately forfeited is equally locked up, for want of proper publicity and information to enable the miner to define its position, as afforded by the Queensland regulations. Over 12 months have elapsed since this greviance was fully represented at head quarters by our neighbours immediately across the Border, and afterwards, we believe, by the Vegetable Creek miners, but their petitions have not borne the fruit anticipated, and the position of affairs to-day is not one whit more favourable to the general public than before action was taken at all. The mining legislation of the New South Wales Government is certainly not calculated to foster the industry—indeed, it would appear from the action of that body in regard to the new industry of tin mining that their policy is rather to retard its development as much as possible than otherwise. The supply of water afforded by the heavy downfall of rain during the past week is sufficient for all purposes, and our regular complaints on this head are at an end for some time. The rain, too, has ceased most opportunely, and a large quantity of ground for some months past either wholly or comparatively idle is by this time in full operation. As a natural result of the rise in the main creeks some little inconvenience has been experienced by a few claimholders, but nothing of importance, and whilst the back claims have been more or less well provided for sluicing purposes, no serious damage has accrued to those claims situated upon the regular running waters, further than a temporary suspension of operations. The stagnant condition of the tin market, however, consequent upon the protracted absence of English advices, has told considerably against general mining progress throughout the district, and will continue so until cable communication is again established. Few feel disposed to extend operations under existing circumstances, and many claimholders are holding the produce of their claims back. To this cause, coupled with the protracted drought, may be attributed the comparatively small weekly transmission by rail during the past few months. The local price for ore has varied during the past fortnight from 36*l.* to 37*l.* per ton, but is at present only about 34*l.*

—*Border Post*, June 5.

RESOURCES OF NEW SOUTH WALES.

Sir,—Although New South Wales is only one out of the many colonies of that empire "on which the sun never sets," yet as being one of the oldest, as well as one or the richest, and as also being of a real and growing importance to the Mother State, with its vast production of wool, meat, tin, copper, gold, and other minerals, a few facts and figures may possibly be of interest, or at the least of information, to some of your readers. An official return just completed, up to March 31, 1876, and laid on the table of our Legislative Assembly by the Colonial Secretary yesterday evening, gives the following detailed particulars of live stock; and, though last not least, of freeholders and leaseholders of land also, and likewise draws the comparison between the two years of 1875 and 1876, which, considering the prolonged and general drought which has just broken up, is much more favourable than could have been looked for, and goes far to prove to what an extent the colony has benefited by fencing, well sinking, and dams:—The horses numbered 357,696; the horned cattle, 3,134,086; sheep, 24,382,536; pigs, 190,950. On March 31, 1875, the returns gave the numbers as follows:—Horses, 346,691; horned cattle, 2,856,699; sheep, 22,872,882; pigs, 219,958. During the 12 months ending March 31 there was, therefore, an increase of 11,005 horses, 277,387 horned cattle, and 1,509,654 sheep; and a decrease of 20,008 pigs. Freeholders under conditional purchase numbered, on March 31 last, 14,028; other freeholders, 9471; leaseholders of land conditionally purchased, 1102; other leaseholders, 6671: total, 31,272,

As regards our trade, the figures for the first five months of the two years run each other very close, and at first glance might seem to convey the fact that we were standing still, but when it is taken into consideration that we have had the severest drought experienced for the last 30 or 40 years, which partially stopped both stock and produce from travelling to port, and checked alluvial and other mining, it rather goes to prove the great vitality of our resources than not. Imports, January to May, 1875—4,761,723*l.*; imports, January to May, 1876—4,741,634*l.* Exports, January to May, 1875—3,337,921*l.*; exports, January to May, 1876—3,345,486*l.* But as the above figures do not include the live stock we sell to Victoria, nor the wool and produce which we send over the border for shipment *via* Melbourne and Adelaide, and which amounts to another 3,000,000*l.* annually, a proportionate addition must be made to above shipments to show the real business done. To determine more accurately the balance of trade between us and the Mother Country, it should be borne in mind that our returns are made up

on the basis of the net cost of goods in England for our imports, and our own colonial market prices for our exports; so that were the necessary and natural profits and charges at each end added the amount of trade done would show considerably larger.

We have also at last begun to sell our iron ores, and there are now some hundreds of tons of superior pigs being sold readily in our own markets; and as iron ores of various kinds and good quality are plentiful, and coal is practically inexhaustible, there is little doubt of the success of iron now. As to coal, it exists more or less over thousands of square miles, and at very easily worked depths, the celebrated Wallsend seam, which extends for 15 miles at the least west and south of Newcastle, being worked at from 150 feet to 200 feet deep; while beneath it two or three other good seams are proved to also exist. In other places seams can be worked by tunnels even, and there are all kinds—steam, gas, and household—and now that the new shipping works at Newcostle are nearly ready we shall be able to ship another half million tons easily in addition to our present output of a million and a quarter annually. We are also blessed with a surplus revenue of over 2,000,000*l.*, which will probably be devoted to extending our railways through the great plains of the interior, so as to tap the trade which now follows the rivers down into Victoria and South Australia, and as they will also open up the lands to agricultural settlement on their line, and thus secure continuous and increasing improvements and employment for all, it may fairly be assumed that with all these elements of wealth and progress England has not a more valuable colony than New South Wales.

Sydney, New South Wales, June 29. R. D. ADAMS.

NEWPORT AND ABERCARN COLLIERY.

SIR,—Since writing you last week my attention has been attracted by an article in the Hereford Times, a local paper with a very wide circulation, headed "Colliery Enterprise in Monmouthshire," to which I desire to refer specially, premising that the sinkings (a rather ominous word, by-the-bye) were commenced in May, 1873. The article referred to states "that after passing through every conceivable stratification the sinkers came to the famous Elled seam of semi-bituminous steam coal extensively worked at Tredegar, very compact and workable, and 3 ft. 1 in. thick."

I would ask, with confidence, what are the proofs of this assertion? The Elled coal is one compact vein, whilst the newly-struck coal is in two distinct seams. The Elled coal at Tredegar has a good top and bottom, that at Abercarn bad in both. Time will tell whether or no this vein, shown already not to be "compact," will prove "workable;" but is not the seam in question the long-looked for "charcoal vein" worked for several years at a loss at the old colliery, and long since abandoned by reason of such loss? This vein, if not the "charcoal," is not found in the old colliery. It seems, then, that until 307 yards are reached the steam coal series are not reached.

The Hereford Times goes on as follows: "Only 15 yards further down the No. 4 seam, or Aberdare 4-ft. seam, and 5 yards lower still the Aberdare 6-ft. seam are known to exist, and will be cut through shortly." Every man of experience of the South Wales coal basin well knows that the Elled coal at Tredegar is the self-same coal as the 4 ft., which is not reconcileable with the assertions in the Hereford Times. Only 5 yards lower down is the Aberdare 6-ft. coal. Not to occupy too much of your valuable space I ask a simple question: The charcoal veins being found in the old colliery, and proved beyond doubt to be worthless, how does the writer in the Hereford Times account for the absence of both the 4-ft. and the 6-ft. seam? The writer goes on—"Thirty yards lower still, however, and 45 yards below the Elled seam now being worked, is the renowned Black Vein seam, nominally 9 ft. thick, but running no less than 11 ft. from top to bottom." The writer gives the distance from the coal last found to the next, or No. 4 seam, to be 15 yards; coal (say) 5 ft., and 5 yards lower the 6 ft. (2 yards) coal, and then adds 30 yards lower still to the "renowned Black Vein," and with some particularity he gives the distance as 45 yards from the Elled, which I make 52 yards.

It appears to be the fact that neither the No. 4 seam nor that which he calls the Elled seam, nor the 6-ft. seam, are to be found as workable seams, and have never been worked at the old colliery close by, and let those interested draw their own conclusions as to their being found workable by the present sinkings. I hope to be able to resume the subject ere long. A SOUTH WALIAN.

RAILWAYS IN CORNWALL—No. II.

SIR,—In the Supplement to the Journal of Oct. 5, 1872, I commenced a brief description of the railways in Cornwall, intending at that time to resume the subject at an early date. In my letter of that date on Oct. 1 I spoke of the tramway from Portreath to Poldice, of the railway from St. Austell to Pentewan, of that from Redruth to Hayle, now an integral portion of the West Cornwall Railway, of that from Bodmin to Wadebridge, that from Liskeard to Caradon, and of that from Par to Bugle, now a portion of the Cornwall Minerals Railway.

In the year 1836 railways, as a subject for investment, were in high public estimation when some lawyers and engineers in London, &c., projected a line from a connection with the London and South-Western Railway at Basingstoke to Penzance and Falmouth, to be called the "London and Falmouth Railway." The number of shares I do not remember, but I remember that they were 10*l.* shares, that 1*l.* per share was called up at once, and that about 100,000*l.* was paid in for deposits. The passage of the Bill through Parliament for its construction was unopposed, except by its promoters. It seems strange to say that, but it was so, and that from the following circumstance:—Several gentlemen took up a much large number of shares than they had means to carry out, having taken them with an intention to sell at a premium, but there were few buyers at any price. I sold my shares at 50 per cent. discount in anticipation of a crash. Those gentlemen seeing that if the Bill passed into an Act they would be called on for 10*l.* on each share taken employed counsel to get the Bill thrown out, and so it was in 1837. No account was ever rendered from that day to the present of the application of the deposits. The country solicitor were paid off at about 50 per cent. of their claims, so I suppose the London promoters must have pocketed a large sum.

The next time that a railway through Cornwall was projected was in 1844, when two projects were announced—the Cornwall Railway (since constructed, and now in use—opened May 1, 1859) and the Central Railway. The Central line was to run from Exeter to Okehampton, Launceston, Bodmin, Indian Queen's, Mitchell Truro, Redruth, and Penzance. In the session of 1845 these opposing lines were brought before Parliament, and both fell through. Capt. Moorsom, the engineer of the Cornwall line, proposed to cross the Hamoaze in a boat or boats, and to have a viaduct to carry the line across Penryn Creek to Greenbank, Falmouth, thereby stopping the navigation to that town except by barges and boats. In 1845 Mr. Brunel was engaged as engineer of the Cornwall Railway, and Mr. Locke as that of the Central Company.

In 1846, I think it was, an Act was obtained for constructing the Cornwall Railway, but for want of funds the line was not opened till 1859, and but for the aid of the "associated companies" it is probable that it could never have been opened. Those companies, by guaranteeing the interest on loans, raised most of the capital expended, amounting to about 1,500,000*l.* sterling! The Albert Bridge, at Saltash, cost about 250,000*l.* There are about 4½ miles of viaducts. The original shareholders are not likely ever to receive a shilling interest. The Cornwall Minerals Railway, which was opened for goods traffic two years ago, and for passenger traffic two months ago, extends from Fowey to Newquay, crossing the entire county. That portion of the line which extends from Par to Bugle, except a deviation of about two or three miles in length near Luxulyan, was constructed for horse traction by the late Mr. J. T. Treffry.

The present company have avoided a long steep incline, over which the wagons were drawn by a water-wheel. Luxulyan Valley is noted for its beautiful woody scenery, but the curves of the line there are remarkably sharp, greatly limiting the speed of the trains. The same company have taken a lease of the Lostwithiel and Fowey Railway, seven miles long; also the line from Burngullow to St. Dennis. The Cornwall Minerals line has numerous branches to take china-clay to Par and Fowey, of which article an enormous amount is carried on it every week, but the article for which the line was chiefly constructed is not forthcoming—I mean iron from the Perran Mines. These mines fell into liquidation a year or two ago, but it is said that another company has been formed to carry out the works, which will supply a large traffic for the line.

Truro, Aug. 22. R. SYMONS.

MINING IN CORNWALL—ECONOMIES IN WORKING.

SIR,—The present depressed state of Cornish mining is such as to call forth the greatest anxiety. The large amounts of money that are paid in calls and the uncertain period of their continuance try the strength of the nerves of the boldest mining adventurers, who have already realised the full force of the truth that "hope deferred maketh the heart sick." All who have practical experience in Cornish mining have abundant proofs that a change must come from some quarter or other if this staple industry is to lift its head again. But all are not agreed as to what quarter or shape relief is to come from. Some are of opinion that it is hopeless to look for an increased price for copper and tin. Looking at the past history of the prices of these metals unaccountable fluctuations present themselves to the eye that have arisen from causes almost entirely unforeseen by the most far-seeing in these matters; and the question may be reasonably asked, what grounds are there for coming to the conclusion that the age of fluctuations in the prices of copper and tin has passed away? Until this can be established the natural inference is that it is not broken up, and fluctuations will move on with a regularity more or less even, according to peculiar circumstances influencing the whole business.

It was the opinion of some practical mining men that no material decline in the price of tin need be feared but a very short time before the recent heavy drop took place. It is to be hoped that the desponding ones will be equally truthful in their opinions as to its future price. One little political breeze in the State of Chili would send the price of copper exceedingly high. Increased demand or other causes would have the tendency to put up the price of tin.

It is a stern fact, however, that the standard for copper as well as tin is at present too low to admit of the majority of mines in Cornwall being worked at a profit unless improvement in the cost of working is made. And a very grave question naturally forces itself on the interested, whether there cannot be any internal remedies found in the mines themselves to compensate for the low prices of these metals. The question opens up, moreover, a very wide field for applied improvements. To begin at the beginning is to start with the lords, many of whom have certainly come nobly to the help of the adventurers. But these instances, it is to be feared, are not general, and the bulk of the leases under grant are on such high dues and terms as to have a crippling tendency upon the whole mining industry, and the sooner the lords consent to easier terms the better for themselves, as well as mining generally. This is one main source for mining to look to for help, and the greater attention is paid to it the better.

Most mines in Cornwall are pumped by means of steam-engines, which consume very large quantities of coal, forming a considerable item in the yearly expenditure. An improved duty would be a source of considerable saving, and the engineers and managers would not fail to find here scope for economy. The purchase of materials generally presents a wide field for economy. The sum for merchants' bills at mine accounts forms a very large proportion of the total expenditure, and the purchasing of materials, coals, &c., at the cheapest market is a question of vital importance.

The question of lessening the cost per fathom of spending the ground has of late engaged the attention of engineers by the means of stronger explosive materials to blast with, and there can be no doubt that great improvements have already been made in the provision, or rather the production, of more economical materials than ordinary blasting-powder. Dynamite effects a great economy, and would effect a much greater if the manufacturers would sell it at a lower figure.

The introduction of boring-machines to drive holes in underground operations has been a matter of earnest consideration for some time past, but has not yet met with that support from Cornish mine adventurers its importance demands. Attention, however, is beginning to be paid to the subject, and there is little doubt that this exceedingly important matter will have a way made for its merits. It is considered by many practical men that boring-machines are destined to effect great saving in mines.

The above are some of the leading channels in which economies, more or less, can be effected in the working of Cornish mines; but they are by no means all. There are other sections that are capable of great improvements, among which are the following, and which are untouched by pens generally, for the reason that they are, to a great extent, unknown to mining adventurers. They are these, and they tell most fearfully against successful mining:—

1.—The quantity of labour performed per man per month, on an average, throughout Cornwall is so far short of what was done a few years since that that item alone is quite sufficient in itself to account for a large portion of the loss in mines. This is a subject which appears to have been overlooked; but it is, nevertheless, one of the leading causes why Cornish mines do not pay now as well as formerly. How to remedy this is a matter of great moment. It has been brought about by various causes; but one is the system of letting on tutwork what might have been let on tribute, and the result, known to all practical miners, has been a lessening of the quantity of work done for the money.

2.—Mining is a pursuit of search—pre-eminently so; and the letting on tutwork what might be let on tribute sets aside the searching and speculative spirit and practice of the working miner. The importance of this is only fully known to the practical. With the tutwork man whether productive or unproductive ground is stoped is not his interest to consider; on the other hand, the tributer pursues the ore and works his pitch in such a manner as to make it produce the greatest quantity of precious ores. The tutwork man ignores all side branches, and buries them if he can before the captain sees them, for fear he may have to take them down, it being to his interest to allow them to stand. The tributer pursues the mineral whatever course it takes, and often makes such discoveries as to be the very salvation of the company; suffice it to be stated that tributing makes mines profitable when the tutwork system makes them losing concerns.

3.—The exceedingly unsound system upon which a large number of mines are worked makes it impossible for them to be profitable. The bubble manner of bringing them before the public is not alluded to here particularly (for this section of the business more particularly belongs to the promoter of mines); but the onus rests on those who have the management of mines. The fact more particularly alluded to is the enormous cost paid per fathom for the ground spent underground in the proper working of the mine. The cost per fathom of driving, sinking, or stoping is frequently published in the papers for the better information of shareholders who reside at a distance from the mine where their money is invested, or rather the so-called cost per fathom, for the real cost is generally different from the reported cost, which may be true and false too. The true cost per fathom of working any mine is the total monthly cost of the company against the total number of fathoms of ground spent for that month. It is not an uncommon case to have about 10 fms. of ground spent for the month, and the expenditure of the company be 500*l.* for the same time. The actual price paid to the mines may be 10*l.* per fathom. The real cost to the adventurers, however, is 50*l.*, and it is a very easy thing to find mines in which there has been expended by the adventurers 10,000*l.*, 20,000*l.*, 40,000*l.*, or 60,000*l.*, and when the quantity of ground spent is compared to the total amount of money it will be found that it was an utter impossibility such concerns could pay, the average cost per fathom being so great that no lode, unless unusually rich, could pay. The mere cost per fathom, then, paid to the miner gives but a very incorrect idea of its real cost generally. The grand question is, what is being paid on an average for all the ground spent throughout the mine. It must clearly appear that many mines which are making large returns might reduce the cost per fathom by increasing the number of fathoms spent on the course of the lodes, and thereby make profits instead of losses. It is submitted, then, that Cornish mines embracing this management contain the elements within themselves of improvements that would greatly benefit them.

Aug. 21. MINE AGENT.

P.S.—I may supplement my remarks by suggesting the greater use of direct-acting and one or two kinds of portable engines and improved stamping and dressing machinery. Let prejudice so deeply rooted as in mining districts forever vanish, and progress will ensue.

MINING REVIEWS, AND OLD REMINISCENSES.

SIR,—Your Cheltenham correspondent calls attention to the annual reviews of mining progress which I published for a long series of years in the *Mining Journal*, and afterwards in the form of pamphlets. They commenced, I think, nearly 40 years ago, and lasted 21 years, but they entailed such immense labour, trouble, and anxiety, that I was compelled to give them up, and afterwards the results of my visits to Cornwall and other mining districts were published under the heading of "Cornish," and other "Notes."

It is not possible that I can undertake again the vast amount of labour and anxiety that those reviews cost me; nor is it so much necessary. The publication of mineral statistics which I then commenced has since been taken up by Government, and accomplished in a far more copious and comprehensive form.

In regard to making public my *private* opinion upon the different mines quoted in the share market it would be a most invidious task, and I must decline to undertake it. The market is full of "bulls" and "bears," and of people who think more of jobbing in shares than of legitimate mining, and opinions whether adverse or favourable would be sure to "hit" upon some inflammable material.

In the annual reviews referred to by your correspondent I wrote honestly and fearlessly whatever I conceived to be true and for the public benefit, and, in consequence, I was for many years the "best abused man" in London, and those who know anything of the constitution of the mining market, and what it was in those days, can very well imagine the style of verbal abuse I got. I remember, also, on one occasion, after writing something which made a pet scheme collapse, an individual called upon me in a furious passion, holding a horsewhip in his hand. But he soon cooled, and put down his whip, when he saw I could very easily have pitched him out of the window! In fact, I rather enjoyed this sort of thing then, but am too old for it now. Still, I have my opinion of things in general, and of mines in particular, and shall be glad to give them privately to any of your correspondents who may address me. History generally repeats itself, and in looking over some of the old reviews, called to my mind this morning by your correspondent's letter, I find some remarks which I should like to quote, as bearing upon the present times.

In the review of 1853 I wrote: "To give a correct idea of the progress of mining adventure becomes every year a more interesting, as well as a more difficult, undertaking, as few commercial pursuits have grown into such importance in so short a time, or have been so universally taken up by the general public as the 'searching for mines and minerals.' The spirit of speculation would appear to be infectious, and the most cautious, as well as the most speculative, embark in that which 'fascinates more than it deters.'* Besides, we all like the idea of making a good 'hit' in a mine, and although it is too much to suppose that everyone we take in hand must succeed, I do certainly believe that with ordinary discrimination in the choice of mines, and the necessary means to carry them out, few speculations in general pay better, or, in some cases, so enormously." (To show the practical results of mining operations, I then gave the particulars, too long to quote here, of the copper sales from 1729 down to 1853.)

Referring, then, to the share market, I said: "I do not remember in any one year such great and frequent fluctuations in the value of mining property as we have had in the year 1853. In the early part of it we had a period of great success amongst the productive mines, a state of excitement in the market for all descriptions of shares, and a run of high prices for dividend stocks, and the latter, if not the former, has continued to the end. Almost anything, too, in the shape of a new mine would sell at a premium; and it may be supposed, without any great stretch of the imagination, that the market was well supplied with speculations, all of them of the 'greatest promise,' so long as the furor lasted, but few of which survived the effects of the panic brought on by over-speculation in the first instance, and made worse at last by wars and rumours of wars in the East."

In 1854 I wrote: "At the commencement of my review of 1853, I entered into a statistical account showing the steady and gradual increase in the produce of the different metals from the year 1729 to 1852, that being, as I considered, the best indication of the good and practical results of mining enterprise—an enterprise, too, which mining companies, and the natural love we all have for speculation, have more to do with than individual exertion. Many mining companies, as daily experience shows, are mere gambling adventures, which cast an odium upon all mining operations, however fairly carried out and profitably worked; but that many *are* both properly and profitably conducted the following returns will, I hope, sufficiently show." . . . . "In regard to the share market, we were twelve months ago in the midst of a panic, although at that time it was confined principally to young and speculative mines. Taken as a whole, however, the year may be shortly described as one of unparalleled depression, and of almost unparalleled losses."

Here then, in 1853 and 1854, we have the description of a panic similar to that which has now pervaded mining for the last two years, and it may pass away as quickly as its predecessor!

In 1855 the change was remarkable. I commenced my review of that year thus: "Many circumstances have occurred in 1855 to render it one of the most important years in the annals of mining; for whether we now regard the prosperous state of our home mines, the remunerative price of metals, the large amount of dividends declared, the great advance in the price of shares in general, or the buoyancy of business transactions, they form a great contrast to the year 1854, which at this time twelvemonth was described as one of 'unparalleled depression and of almost unparalleled losses,' and also to many previous years. Good, however, sometimes comes out of evil; and the principal cause of the mischief of 1853 and 1854—the number of new mines introduced to the public, and the heavy calls made to work them—made it imperative that many should be abandoned, which was done at great loss it is true, but their stoppage enabled many persons to breathe more freely, and to turn their attention to dividend mines, and to those which were progressing towards a profitable state."

In 1853 and 1854 lead, as tin now is, had been in a dreadfully depressed state, owing to causes which I fully set forth in my review, but in 1855 there was a great reaction, and it rose 5*l.* per ton. Should the present depression pass away suddenly, as the former panic did in 1855, and I think it will, there may be a very active time again, but chiefly in lead mines, many of which can now be bought at low prices, and with fair prospects of a rise of 50 to 100 per cent. Some copper mines may also do, but tin requires further purging. J. Y. WATSON, F.G.S.

St. Michael's Alley, Cornhill, Aug. 19.

MINING IN IRELAND—OOLA MINE.

SIR,—I see in the Supplement to last week's Journal a report of Oola Mine, in the county of Limerick, Ireland, by Mr. George Henwood. I beg to say that Capt. Champion, of the East Wheal Rose Mine, never had anything to do with the Oola Mine, neither was Capt. Champion, of the East Wheal Rose Mine, ever in Ireland. I may say that I do not believe that any company of adventurers would close up a mine only 35 fms. deep, with a branch of lead from 12 to 18 in. wide. Such a branch of lead would or ought to pay all cost of working the mine and give the adventurers good dividends. I was on the Oola Mine with a gentleman from Yatton, about six years since. I know something about Ireland and lead

* This remark was made by the Times some years before in reviewing, I think, my "Gleanings among Mines and Miners."

mining in the counties of Limerick and Clare, and it would not do for us, as we had not any money to throw away.

Mount Hawk, St. Agnes, Aug. 24. JOHN CHAMPION.

DYNAMITE, EXPLOSIVES, DETONATORS.

SIR,—I quite agree with your correspondent, "Wake-up." Does it not show a sluggish intellect in our legislators and commercial men to tolerate a patent law that will permit a foreigner to come over here and obtain a patent—an exclusive monopoly to extort 40 per cent. more for a manufactured article than he can obtain in his own country, and at which he, as well as others, will sell it? Why is there no combination to contest the validity of this patent? Why do not consumers test the question? The Germans will not recognise it. The Americans will not recognise it. Prof. Mowbray was defendant in an action brought by the dynamite company in America, which they lost, and paid all costs.

The time for a union to break down this unreasonable monopoly has come. Will consumers patronise an explosive as strong, free from poisonous acids, and one that will enable the miner to resume his work, there being little smoke almost the moment the charge has been fired? Will they bind themselves to patronise this new explosive at 1s. 6d. per lb.? A charge of 65 grammes has accomplished as much as 80 grammes of dynamite, thereby proving, weight for weight, it is 20 per cent. cheaper, or 45 per cent. reckoning the the 25 per cent. lower price. Will consumers bind themselves to use this explosive, provided that it is proved to be equal in strength to dynamite, and that it can be sold at 1s. 6d. per per lb., as against 2s., the price of the dynamite? On an intimation from the mine agents of Cornwall and Devon, I will place myself in communication with the patentee and the manufacturer of this mixture, which I may say is of the nitroglycerine class. Detonators I can and will supply, in quantities of not less than 1000, at 25s. per 1000, as against the extortionate price of 35s. charged by the dynamite company. Of the quality the following testimony of Dr. Attfield, analytical chemist, Bloomsbury-square, London, speaks for itself. There are no stronger treble-charge detonators made:—

"Mr. Waddington,—Dear Sir: Your copper detonator contained 9¼ grs., or 0·63 of a gramme, of fulminating matter. Allowing for a little cementing material, 100 would contain 54 grammes, or rather over 800 grs. Thus, 100,000 would contain even more than 100 lbs. of powder.—Yours faithfully, JOHN ATTFIELD."

I do not wish to make an extravagant profit out of these articles. At the price named there is a good profit, if paid for in one month. I shall be glad to assist anyone who will undertake to sell the detonators at this price. There are other detonators, which are not quite so long, that can be sold at 20s., containing an equal strength. Communications may be addressed to me at Wheal Agar Mine, Pool, near Camborne. Let mine agents state the quantities they are open to take monthly or quarterly.—*Aug.* 24. H. WADDINGTON.

P.S.—Dynamite is a compound of nitroglycerine and silica, the latter an inert inexplosive substance, simply employed by the inventor to give a paste-like form to the explosive liquid. In No. 1, or first quality dynamite, 20 per cent. of the quantity is inexplosive. The defect of nitroglycerine paste or dynamite is, the higher the silica is charged with nitroglycerine the greater is the tendency of the paste to crystallise in cold weather, and to exude the explosive liquid in hot weather, in other directions rendering it dangerous to the miner. Brain's powder, on the contrary, is an inert or useless substance, the percentage of nitroglycerine which it contains is about 45, whilst the remaining quantity is in itself a powerful explosive. The incorporation of one part with another may be said to be perfect, whilst in strength it is superior to dynamite, and in itsuse completely inoffensive, producing no deleterious or objectionable gases.

THE EXPLOSION AT WEST BASSET.

SIR,—Although I have always expressed an opinion in favour of old-fashioned gunpowder of good blasting quality as compared with dynamite, lithofracteur, tonite, or any other of the new explosives at present being pressed upon the market, I feel bound to admit that where a man calling himself a miner uses, as the poor fellow did at West Basset, an iron bar and sledge hammer to drive down a cartridge, because it is too large to fit the hole, it is scarcely worth while to consider whether the particular explosive used is safe or otherwise; and the remarks of the Government Inspector that the Mines Regulation Act permits the putting in of cartridges in the way mentioned shows even greater ignorance than was displayed by the miner.

The number of dangerous statements—if they be not absolute falsehoods—crowded into the circulars, and the directions issued by the vendors of the several new explosives is really lamentable, and they are the more to be regretted because they are altogether unnecessary. Barrels of tar are not labelled "poison," although the drinking of a quart or so of it might cause death, but the vendors of explosives take the pains to label their wares with exaggerated statements as to their safety, so that they do not give the workman a chance to protect himself. Thus, the Dynamite Company, whose manager has been blown to atoms by their explosive, tell the users of that material to avoid the danger of using frozen dynamite to thaw it by putting it in their breeches pocket—a process extremely likely to facilitate the exudation of the nitroglycerine, and which must sooner or later lead to some serious accident. The Cotton Powder Company, who appear to be the vendors of the tonite, are still more reckless, and actually issue directions which almost justify the use of the iron bar and sledge-hammer in the manner complained of. There appears to have been two accidents with tonite in one day, and from the evidence taken at the inquest the question should really have been raised whether Capt. Nicholas and Mr. S. J. Mackie ought not to have been committed for trial for manslaughter, since it was their statements as to the safety of the tonite that was the direct cause of the death. Perhaps at the second inquest, for I suppose another must be held as the first jury gave no verdict, the criminal responsibility of Mackie and Nicholas should at least be considered, and it should also be ascertained upon whose authority Nicholas made the strange statement that if they hammered the tonite on a blacksmith's anvil it would not explode, as this depends entirely upon the manner in which the hammer is used.

Redruth, Aug. 24. COPPER TAMPER.

INFLATION AND DEPRESSION—THE PRESENT AND THE FUTURE.

SIR,—There are signs of incipient recovery from the continued depression in trade and commerce, and the future exhibits prospects of far more healthy business than has existed for many years past. It is a truism, very generally lost sight of, that markets and industries cannot forever be buoyant and expansive, and it is essential—nay, imperative—that periods of inflation should inevitably be followed by others of stagnation; prices cannot always rise, nor can they forever fall, if the true standard and equilibrium of value be maintained. The rapid construction and extension of our net-work of railways through all the changes of time and opinion have survived the withering blasts of opposition and panics, and the country is all the richer by a billion sterling through their construction, while the money has circulated throughout the country, enriching many, creating industries, ameliorating the social, political, and commercial position of the nation, and still exist for the future a vast source of wealth and industry, and a living memorial of England's pluck, energy, and enterprise, bequeathing to future ages a revenue fully equal to the taxes of our national indebtedness; we thus neutralise the impost created by our forefathers in transmitting the invaluable boon of iron roads to those who follow in their footsteps. Again, ocean telegraphy has proved a success, and it is equally certain that success in the future will be far greater. The advantages to coming ages will be far greater still, while, probably, the trade and commerce of the world will become vastly augmented, and England more than ever will become the chief emporium and centre of merchandise, manufacture, and mechanical skill and products.

If the world's commerce is in its youth, as many predict, it is assuredly not too much to add that railway traffic is in its childhood, and telegraphy in its infancy. Australia, New Zealand, China, and ultimately Japan, and a host of other isolated states and countries, cannot long remain without telegraphic communication with this country, and thus lay open their treasures of metals and products to the energy, enterprise, and competition of our merchants and traders. Thus the future is both encouraging and expansive, yet we could never hope to obtain these results if markets were ever buoyant and prices advancing—hence the advantages which arise through epochs of depression and stagnation as have prevailed in this country for the past two or three years. What England requires is the products of the foreigner at the least possible cost, and the supply of her own manufactures and products at the highest possible charges in exchange. Barter is, in fact, the traffic needed, though it may assume a thousand forms in manipulation. We want to buy in the cheapest and to sell in the dearest markets of the world; therefore we must not destroy the legitimate standard of supply and demand—if we do we shall have periods of inflation and depression as at present prevail in respect to the latter throughout the whole country.

The wild career of Cornishmen in sending up the prices "to fever heat" of Dolcoath, Cook's Kitchen, Tincroft, Carn Brea, South Crofty, Providence Mines, Margaret, Great Work, Trumpet, and other mines, in proportion produced the inevitable result of inflation—depression. Hence the stoppage of North Roskear, Seton, North Crofty, Great Work, St. Ives Consols, Old Great Vor, and Margaret, with numerous other mines of no good whatever to capitalists, yet enhancing the supply of tin and other ores that interfered with the progress and prospects of many a deserving and promising undertaking which stood neglected and languishing for want of recognition and support. It is now a boon to the mining interests of Cornwall and Devon to know that their mines are reduced in prices to their least possible minimum value, for whenever a change takes place in public opinion, and the hoarded gold of capitalists again circulates, the surviving mines of the western peninsula must necessarily receive attention; they are the best, and the crop of a severe pruning, while their commercial worth is reduced to the lowest standard—hence the future is both healthy and promising, and with a rise of 10*l.* a ton in black tin the profits would be large, and the advance and activity in prices and dealings something astounding.

Out of evil often springs good, and it is to be hoped that the severe ordeal through which mining has passed will induce landlords to accept dues from paying mines alone, as those struggling for success, and oft for mere existence, should be wholly exempt from impost. The land destroyed is always paid for, and that charge alone is enough for prospective mines to encounter. There are many lodes (especially lead) as yet unwrought, and though discovered and highly charged with minerals neglected, and at a standstill for lack of capital. It behoves all landlords to be liberal in dues and charges. then we predict the day is not distant when Cornish mining will once more revive. If we are not greatly mistaken all industrial pursuits will make a start in the spring of next year, hence it is desirable for promoters and vendors to come to conclusions without delay, for it should ever be remembered that it is "the early bird that catches the worm." R. TREDINNICK,

79, *Cornhill, London, Aug.* 25. Consulting Mining Engineer.

PROSPECTIVE AND PROGRESSIVE LEAD MINES.

SIR,—I have to make my acknowledgements for your insertion in your last issue of a letter from me on the above subject, and will you kindly once again accord to me the same favour? The market for lead is still well sustained, although mining in all other forms, and in almost all countries, has suffered considerable depression. It is observable that in different countries this is attributed to different causes. In the United States it is ascribed to the depreciation of silver more than to any other cause, while in the Iberian Peninsula, especially in the Lusitanian portion, it is attributed to the scarcity of silver, for large supplies of which they have sent to this country. In Chili they complain that the European markets and those of the United States are glutted with copper, the mines in that part of the world having been "living too fast." In Peru and Bolivia they complain of a want of facility for conveyance to the Atlantic Coast, and the enormous expense attending the conveyance of cargoes round Cape Horn. In Mexico and Central America industry is not secure; the lawlessness of the people frustrates the operations of the miner, merchant, and agriculturist.

There has even been some grumbling in Australia, although without cause so far as we can see. Fresh gold claims are lighted upon, and tin claims in Tasmania, Queensland, and elsewhere are eagerly sought. The varying fortunes of British mining we have attributed to the general quietness of commerce caused by over-trading, desperate speculation on the Stock Exchange, dangerous and unsound financing, banking unsound and often dishonest, and the mad fever for foreign loans which seized upon the public, and was sustained so long to the ruin of many, and the loss to some extent of multitudes of small capitalists.

The allegation that mining for the superior metals in the United Kingdom is going to perdition is, however, not true. During the seven months of 1876 which have elapsed our exports show well, and this has been continued during so much of August as is gone. Intelligent mining men among the grumblers say that the warehouses of the metal merchants have been "groaning beneath their ponderous and long accumulating stocks," and they are sending these away at very low profits. Now, as the exports for nearly nine months have been very considerable stocks cannot now be so heavy, and our customers will not buy what they have no use for, and the metal dealers are not celebrated for giving their goods away, either to foreigners or their fellow-countrymen.

At all events, Mr. Editor, we want lead; the need of it is growing. This is, as Dr. Vaughan called it "the age of great cities," and their demand for lead must of necessity increase, as never in its history was it so much used for building purposes. I think, Sir, you will bear me out that your columns from time to time furnish evidence clear and conclusive that this is the time for investing in progressive and prospective lead mines. "Now's the day, and now's the hour." He who now invests secures the flowing tide of a rising market whereas he who defers (having a preference or partiality for mining) will find everybody holding their investments fast, and shares will be only procurable at a price which will leave profits beyond all comparison smaller than it is reasonable to expect in lead-bearing mines. There are good opportunities, particularly in Wales and Ireland. England at present does not furnish such large areas of lead ore as are to be found in the Principality and Ireland. In the latter, across the whole island, from the high reefs of Wicklow to Croal Patrick, and in the Comeras, Galtes, and other ranges south and north of this line. All these ranges of country, pregnant with lead, ought to be opened up. It would remunerate all engaged in the important work; and, were our mining enterprises equal to our resources, the wealth of the country and the employment of the workers would be greatly increased.

It is our opinion that the richest fields of lead ore in the United Kingdom are to be found in Wales. It is to be obtained in Cardigan, Monmouth, Merioneth, Montgomery, Flint, Carnarvon, &c., sometimes with one metal, sometimes with several mineral substances, but chiefly with siver, the proportion of ounces of that metal to the ton of ore, being in some cases very large.

I called the attention of your readers to the property of the Bodidris Mining Company (Limited). It is, as stated in my last, in the county Denbigh, and for about 1½ mile the property extends along the principal lode. It is certainly one of the most favourably situated lead mines in Wales; and I can express myself as confidently as I can of anything in connection with mining that it must be a great and remunerative mine.

The communications which I receive are all such as to show that success is ensured. I quoted one which was very pertinent and decisive last week, allow me to give another on the present occasion. Writing of the geological character of the property, the gentleman referred to observes—"The stratum is the lead-bearing limestone, in which all the rich mines of Flintshire and Denbighshire have been found." As to its favourable topographical character he remarks—"It is in the immediate vicinity of some of the richest mines in Denbighshire and Flintshire." As to the qualities of the mine itself, it is stated "There are three well-known veins running through the property, forming a junction in the eastern part of the ground. Only one of these has been worked upon to any extent, from which a large quantity of ore was raised, but the works were closed in consequence of the low price of lead, and the losses of the then proprietors in other speculations." The writer then recommends the opening up of the old workings, as well as vigorous prosecution of general operations.

The joint testimony of two of the most experienced captains in Wales may here be quoted—"Our joint opinion is that there is not a more promising piece of ground in the county of Denbigh." "Our firm belief is that the mine will not be second to any in the district."

This is the sort of investment which ought to command the attention of all who appreciate progressive mining property.

Finsbury-place, City. —— JOSEPH J. REYNOLDS.

RICHMOND MINING COMPANY.

SIR,—Your correspondent, "Investor," may be congratulated on his dexterous use of the usual well-known "bear" tactics—suppression of facts, and suggestion of untruths. It is true that the original capital was 220,000*l.*, that 50,000*l.* was added by the issue of 10,000 new shares, and that 36,000*l.* has been borrowed on debentures, but it did not suit your correspondent's purpose to add that the mining property now held by the Richmond Company is vastly increased in area—that some 80,000*l.* has been spent out of revenue in developments, new machinery, and erection of the refinery—that the money borrowed on debentures was taken up to supply additional floating capital, and is believed to be fully represented by bullion or other available assets—and that over 160,000*l.* has been paid in hard cash to the shareholders, an amount within 40,000*l.* of the price originally given for the mine. As the prospects of the mine are greater than at any former period, and the reserves estimated at over 100,000 tons, the gloomy suggestions of "Investor" are not likely to have much influence, and his very candid hint that the large returns lately announced may be due to purchased ores is, I learn, equally without the basis of fact.—*Aug.* 25. AN ORIGINAL SHAREHOLDER.

BEDFORD UNITED MINES.

SIR,—I cannot find in Saturday's Journal any reply from Mr. Laws to my letter in the Journal of the previous week respecting the estimated loss of this mine for the four months following the last meeting. I have no doubt Mr. Laws thought discretion the better part of valour; but silence is said to give consent, and shareholders will doubtless take it in that sense. The shareholders at the meeting must have calculated the loss of 550*l.* on the four months, or 137*l.* 10s. per month, to be absorbed by the agents and offices according to my last letter; but this, as I have been given to understand since, is not true, as the following list will show—

Mr. T. B. Laws, secretary, per month	£10 10 0
Mr. T. Horswill, purser	9 9 0
Capt. Goldsworthy, manager	7 7 0
Capt. Phillips, agent	9 9 0
Capt. Burley, agent	6 6 0
Capt. Maker, agent	5 5 0
Coach driver	4 4 0
Horse feed, horse and carriage, taxes, wear and tear, office expenses, agents' house rent, light, fire, &c.	5 0 0
Total per month	£60 0 0

Or 780*l.* per year for a call-paying mine. If this is one of Mr. Laws's cheaply and well-managed mines, I think the company will do well to investigate the matter, and try to ascertain whether a saving cannot be effected by some means. T. H.

SOUTH PRINCE PATRICK LEAD MINE.

SIR,—Having been a shareholder in the above mine from its commencement, I have watched its progress with considerable interest. I have visited the mine this week, and I am sure the shareholders will be glad to be informed that the persevering manager, Capt. John Jones, has come upon what he has been working for, and the directors expecting during the last eight or nine months—the leader of lead in a great north and south lode. I was much pleased to see some fine solid lead ore being brought up in lumps weighing from a few ounces to as much as 1 cwt. each, also carbonate of lead with it. The manager fully expects to meet with a larger body of ore than has ever been seen in the mine; it is daily improving.

Another shaft is nearly down to the lode, and it is expected a communication will be made from it to the driving from the northerly shaft in the course of two or three weeks; this will give ventilation, and will be used as a drawing shaft; and what is also of great importance, will save 30 or 40 per cent. in the labour cost. Altogether, it looks exceedingly promising. The company, although in existence only three years, has already paid 35 per cent. in dividends.

—— A SHAREHOLDER.

GROGWINION LEAD MINING COMPANY.

SIR,—I noticed in last week's Journal a letter from Mr. R. Tredinnick, in which he classes the Grogwinion Mine with a lot of progressive and speculative properties. Will you allow me to inform your correspondent that Grogwinion has been making profits and paying dividends for the past three years, the last two distributions being at the rate of 12½ per cent. per annum. The mine is now sending to market 100 tons of lead every four weeks, and both returns and dividends will by-and-bye be considerably enlarged.

Change-alley, Aug. 23. —— GEO. BEDFORD, Sec.

MINING IN CARDIGANSHIRE, 1876.

SIR,—In reading the Journal of last week I was very much pleased with the reports of the different mines in the surrounding district of Aberystwith. Mining has for a long time been rather dead, and what anyone may attribute it to I cannot say, unless it is fate; but this we must all allow, that the mines, one and all, at once became poor—in fact, at one time there was scarcely a mine to be met with that could pay its own way. Such is the case in this county. I have often noticed it that when once they begin to go, down they go altogether; and, again, when they turn the scale, and show signs of recovery, they ascend as if by magic. Such now is the appearance of the turning of the scale of Fortune. Mines are beginning rapidly to show forth blossoms of success and prosperity to all who may be connected in legitimately carrying them out. Capt. A Francis speaks of the difference in mining now and 35 years ago. Great changes have taken place since then—that generation is almost all gone. Many there are now dipping into mining—and, in fact, into anything else where they can make money by it—that know nothing whatever of its arts and sciences; and I cannot help thinking at times what a pity it is that mining should be so lightly treated and dealt with, for we who were born in it, and worked hard in and through all its branches for a number of years, can only say that as yet mining is in its infancy, and the longer we live the more we have to learn, and, at last, die in ignorance of the greatest mystery of Nature, as our fathers have before us. Yet there are those who will be taken in and led away by such a race of nonentities, lose their money and their confidence in mines, and so-called mining men, that honest, hard working, and experienced mining engineers are looked upon with distrust. I hope it has been a lesson to them and to all the world. If you, friend, wish to go into mining, first find out a man that you can trust to for real information—one of thorough mining experience, one who himself has gone all through the rudiments of mining, and then may you consider yourself pretty safe.

In the first place, amongst reports of the different mines in this district, Captain John Garland, in writing of the Plynlimmon Mine, says of the 24 fm. level that it is worth fully 2 tons of lead ore to the fathom; this is a good lode, not to be seen every day in many of the best mines. Also, that the stopes in the back of the said level are worth 25 cwts. of lead to the fathom, and the bottom of the level above worth 1 ton to the fathom, showing plainly the lode to be improving in depth. Fancy a mine, 24 fathoms deep, with a lode worth on an average 30*l.* per fathom, and this to be found on the highest mountain in South Wales. What may we expect to find in the valleys beneath? Such as the Great West Van (of which more anon), also the West Esgair-Lle, Crown, Temple, Aberystwith, Ystumtuen, Tyny-fron, Caegynon, and Rheidol Mines, and, in fact, a host of them, all destined to come forth soon, we hope, to prove my remarks. The Great West Van, reported upon by Capt. W. Bramwell, he speaks still higher of his bargains than the Plynlimmon, and says the men are busy driving east and west upon the great course of lead ore, and that the eastern driving has brought them into a great or large cavity, commonly known amongst us as a vugh, and this on each side being crystallised with spar and lead ore. Although I have not seen this, I have seen several others in this mine; and, in fact, upon the run of the same lode cavities of the above type may also be seen and entered for some yards in length, and nothing but pure silver-lead and fine crystals can be found in them, the most magnificent specimens in the world. In fact, I know of ore with my brother that is kept under a glass to protect it being blown away by the breath of an evening's quiet breeze, exactly like a flake of snow pinnacled by and with stars of pure silver lead ore, likened to nothing I ever beheld before, and this was taken out of an adjoining mine to the above. Now, we must know that where such an abundance of mineralised ground is found to be so full of such indications there must be large quantities of solid mineral nigh at hand. Capt. Bramwell also says that the men westward have been driving on by the side of the lode, and that by stripping down

the lode occasionally the yield is equal to the former value—50*l.* per fathom. Such a lode I do not remember having seen often; 50*l.* per fathom, equal to 4 tons to the fathom, and yet some people run away with the idea that Cardiganshire mines are done. The West Esgair Lle Mine is still idle; what for I can scarcely say. It is a thousand pities. I have seen the lode in this mine worth fully 3 tons of lead to the fathom in sinking the engine-shaft. I have noticed the magnificence of this lode thoroughly, and am truly sorry to see it lying in its present state. Bryn Glass Mine is the next on the road, but not on the same lode, therefore I do not see the necessity of going over the ground again, having spoken of it so often that I may tire your readers, especially as there is nothing of note to speak on the different mines on the above lode, but merely to say that Bryn Glass has commenced; also that Eliza's Corner is in the same place as it was when formerly so often visited by the said Lady Eliza and her now husband. The company is going on now with this little mine, and, so far, are well satisfied with the good appearance of a very nice, kindly, rich lode. I hope they may succeed.

I will mention one more of the improving mining district this week, and that is of the Tygwyn, or De Broke. Your readers may have seen Capt. J. Phillips's report of this mine (Aug. 9); he speaks also of 2 tons and 1 ton to the fathom, plainly showing that mining is again looking up. Also over the hills towards the Lisburne Mines, Frongoch neighbourhood; and again in the Cwm Rheidol district, in which we may class the De Broke. And still further south come in upon the Bog, Llwarnog, Clara, Powell United, and on to the Cwm Bryno, till you fall, as it were, into the Goginan, Melindur, and West Goginan districts, all of them in hopes of seeing themselves some day classed A 1 in the mining vineyard. I will, by your permission, follow this up next week upon another mining district equally as expectant of every success.—*Aberystwith, Aug.* 22. S. TREVETHAN.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

THE NANT-Y-GLO AND BLAINA IRONWORKS.

A special meeting of shareholders was held in the Memorial Hall, Manchester, on Thursday, to consider the proposed resignation of Mr. Hugh Mason, Mr. Samuel Ogden, and Mr. Richard Hardwick. Mr. HUGH MASON presided, and delivered a long address on the prospects of the company. He said he desired to be released from the board because of the state of his health; he had been anxious to take an active part in the management of the affairs of the company until the completion of the big Chancery suit against Mr. Carlton and Mr. Albert Grant; but they did not appear, after two years' earnest work in the prosecution of that issue, to be any nearer the hearing of it. He had held on to the board in the hope that that issue would have been heard, and that a verdict would have been given in their favour, and that heavy damages would have been inflicted upon the defendants. A considerable time must elapse before that issue could be tried. He had failed to enlist the services of any gentlemen as directors, though he had asked Mr. Benjamin Whitworth, Chairman of the Tredegar Company; Mr. Ellis, Chairman of the Midland Railway Company, who had been nearly all his life successfully engaged in collieries; Mr. Nathaniel Buckley, of Ashton; Mr. Ramsbottom, the late manager of the London and North-Western Works at Crewe; and Mr. Eckroyd, of Burnley. They met the meeting that morning practically with their number actually reduced to three, whereas the meeting in London had advised that the number of directors should be increased to seven. In 1873, when he joined the directorate, the price of coal was 200 per cent. higher than it was that day, and the price of iron was at least 100 per cent. higher. In the face of this enormous drop in the price of coal and iron, the anxiety of the directors had been exceedingly great. It had been impossible coincidentally to reduce the cost of production, but the wonder to him was—seeing when he took office two and a half years ago the company was within twenty-four hours of liquidation—that they had been able to carry on in the face of a falling market. (Hear, hear.) There has been a reduction of nearly 7000*l.* per annum through removing their offices from London to Manchester. In 1873 the sale of coal from their gigantic works was at the rate of 10,000 tons per year; during the last 12 months it had been at the rate of 230,000 tons; and during the last few weeks at the rate of 300,000 tons per annum. They had been unable to effect many economies through want of means, but he felt certain that, with capital, the time was not far distant when these economies would be accomplished. Serious losses had arisen through the American and Russian markets being closed to them for iron; and the pressure put upon railway companies at home to prevent them from spending their capital, for some time past made him think that there would be no immediate chance of improvement in the iron market. Speaking of coal, if trade were even moderately active he thought they could easily find a market for the sale of at least half a million of tons per annum of their coal. Within the last few weeks they had had a small lawsuit with Mr. Carlton. Mr. Carlton had held a mortgage over the property of the company to the extent of 40,000*l.*, and in addition to that he had accepted a bill on behalf of the company to the extent of 5000*l.* They had been forced to find this 5000*l.*, and before the expiration of the 40,000*l.* mortgage Mr. Carlton transferred it to Mr. Tamplin, of Liverpool, and although they had resisted this they had to pay 22,000*l.* in reduction of the 40,000*l.* (Cries of "Shame!") They had a vast amount of undeveloped property. The property was many miles in length, and was crammed with magnificent coal, at a moderate depth; and they wanted to develope that coal field. As they had not capital to do it themselves, they had leased a considerable portion of it to South Wales colliery companies, from which they derived a considerable amount of royalty. If they had seen the worst of the coal trade, no doubt their prospects would brighten considerably. That was the problem for them, and upon that hinged the future of the company. He shrank from it being thought that he was leaving a sinking ship. He would stick to it to the last plank, and, above all things, would like to make those people pay who had been the cause of its disasters. (Applause.) They had had great sinners and small sinners in connection with that company, and it had been a consideration whether they should have attacked those who had received their directors' qualifications free. (A voice: "It's not too late now.") He thought common self-respect ought to have induced these men to at least have brought back the directors' qualification. On personal grounds, he desired to leave the board; but he desired to assist them in getting a new board of directors, and hoped, by an harmonious consultation, they would arrive at that end.

The CHAIRMAN, in reply to a shareholder, said he held 90 preference shares in the company, and 1-28th part of the debenture bonds.

After a few observations from some of the shareholders, it was moved by Mr. STOCKDALE (Bolton), seconded by Mr. RUSSELL EVANS (Newport), and carried—"That the thanks of this meeting be given to the directors for their past services; and that they be urgently requested to continue their office, and to increase their number up to seven as soon as possible."

The retirement of the gentlemen who now constitute the board was unanimously deprecated, one shareholder declaring that but for their presence he would not have taken up preference shares if the guaranteed interest had been 20 per cent. instead of 8 per cent.

It having been resolved to have the Chairman's speech printed and circulated, the meeting closed.

WHEAL UNY MINING COMPANY.

The general meeting of adventurers was held on Tuesday, at the offices of the company, Austinfriars,

Mr. R. C. MCCALLAN in the chair.

The notice calling the meeting having been read, the minutes of the previous meeting were confirmed.

The SECRETARY read the accounts, which stated that the loss on the three months' working was 169*l.* 14s. 1d. At the last meeting the debit balance was 189*l.* 9s. 2d., but a call of 3s. per share was then made, which realised the sum of 589*l.* 3s. 1d., and the balance against the mine at the present time is 741*l.* 0s. 2d. He stated that since the last meeting Hinde's shaft had been completed to the 160, and there was now machinery worth 1000*l.*, which could be dispensed with. They had now a perpendicular shaft to the 160, and sinking on the course of the lode is being proceeded with. Sinking this shaft had been an expensive and unremunerative work, as the ground had been of a hard rocky character.

The SECRETARY, in answer to a question, said the company was now paying 17s. per ton for coal.

The CHAIRMAN, in moving the adoption of the accounts, briefly congratulated the adventurers on the fact that no call would be necessary on this occasion, which must be most gratifying to all, especially so when they consider the present low price of tin, the lowest it had been for 30 years; so, with an improvement in the standard, it shows what the mine was capable of doing.

The accounts were adopted. The following report was read:—

Aug. 21.—In handing you a report on the operations in this mine during the past 12 weeks we have to state that we have been shut out from the 40, west of Incline shaft, owing to a slip of ground choking up the level; we have, however, nearly secured the 60 west, by which we hope soon to gain access to the shallow levels in the western part of the mine, where there is moderately productive tin ground. We are cross-cutting in the 100 end east, but are not yet through the lode. A stope in the back of this level is worth 7*l.* per fathom. The 110 end east is worth 7*l.* per fathom; we have recently holed a winze from the 100 to the 110, which has given good ventilation, and opened ground for stoping. Three stopes in the back of the 110 are worth 30*l.* per fathom in the aggregate. The 120 end east is worth 12*l.* per fathom. A rise in the back of this level is worth 8*l.* per fathom. Two stopes are worth 8*l.* and 11*l.* respectively. The stope in the back of the 130 is worth 15*l.* per fathom. The 140, east of King's, is worth 11*l.* per fathom. Three stopes in the back of the 140 are worth 8*l.*, 8*l.*, and 10*l.* per fathom respectively. In the 150, east of Goodinge's, we are driving a cross-cut north to prove the lode; there is an increase of water in the end, which looks as if the main part of the lode is yet further ahead. The 150, west of Incline shaft, is worth 12*l.* per fathom. Two stopes in the back of this level are worth 12*l.* and 15*l.* per fathom respectively. We are rising the back of the 160 west to meet the Incline shaft below the 150, and are pushing on the 160 end west to intersect the run of good tin ground gone down in the 150 west. We have made Hind's shaft complete from the 130 to the 160, and have recently fixed new pitwork from the 160 to the 130. The old engine has been left to go idle, and is dispensed with. There is a good 70 inch cylinder engine on Hind's shaft, and the pitwork fixed to the bottom of the mine, 160 fms. deep. This new pitwork has been put down, and the shaft sunk in face of the very depressed price paid for tin. The cost of pumps and the continued sinking of this shaft perpendicularly through solid rock have greatly added to the working expenses. Hind's shaft will in future be sunk on the course of the lode, below the 160, which we believe will speedily open out good tin ground. We have sold since the last general meeting over 80 tons of tin, and had not the price of tin been so very low it would have left good profits. The mine is well provided with machinery, and is now in good working order, and should tin advance in price we should be able to make good profits.—WILLIAM RICH, MATTHEW ROGERS, WM. BENNETTS.

The report was adopted, and the adverse balance was carried forward.

A SHAREHOLDER said he had compared the report now presented with that submitted to the adventurers at the previous meeting, and had noticed the work done in the interval. The stopes in the back of the 110 had considerably improved, now valued at 30*l.* per fathom, which according to the present price of tin is equal to ¾ ton of tin per fathom. The 120 had also improved, and below that point the mine looked quite as promising as at the last meeting. The sinking of Hind's shaft to the 160 was commenced some seven or eight years ago, but on account of the difficult and unremunerative character of the ground the work had been much retarded. However, it was now completed, and would, doubtless, have an economical effect on the future working of the mine. But for the drop in the price of tin since the previous meeting no loss would have been made, and even now the surplus machinery would more than cover the debit balance.

Mr. THOMAS expressed his satisfaction at the way in which the shaft had been sunk, a work which reflected great credit on the management.

The meeting closed with a vote of thanks to the Chairman.

PLYNLIMMON LEAD MINING COMPANY.

A special general meeting of shareholders was held on Wednesday, at the offices of the company, Austinfriars. The meeting was called by Mr. E. W. Wingrove, the liquidator, for the purpose of receiving a report as to the position of the company, and that gentleman occupied the chair.

The CHAIRMAN said it would be in the recollection of such gentlemen who were present at the meeting held on June 30 last—when he was appointed liquidator of the company—that a scheme was propounded and brought to the notice of the meeting, and approved of by those present, that endeavours should be made to form a new company, and to take over the property and assets of the old one. The subject was fully discussed at the time, and it was considered that unless 2000 shares of 2*l.* each were subscribed for in any new undertaking which might be formed it would be better to consult the shareholders again before proceeding to realise the property of the company. He now informed the shareholders that the offer of subscriptions which had been sent in to the new company amounted to about 1200 shares, and he ought to mention that most of those were subscribed for expressly on the condition that the minimum of 2000 should be taken up. Therefore, it would be seen that up to the present there had been only a partial answer to the appeal which had been made to the shareholders, and in consequence the proposed arrangement regarding the new company must remain in abeyance. Therefore, as the liquidator of the company, it would be his duty, without any unnecessary delay in winding up, to pay the creditors so far as the assets would permit. It must be evident unless some speedy steps were taken he should have no course left but to offer the property for sale to the best advantage, to realise as much for it as possible, and divide the assets amongst the creditors. Of course, he could not keep on working it. The mine had certainly greatly improved during the last month, as was shown by the latest report which had been received from the mine, dated Aug. 19. There were specimens of the ore referred to in that report in the outer office, and those specimens were as good as anybody could desire to see. Two tons per fathom of such ore would, he need scarcely say, make a very fine mine. There were many evidences of the mine looking well at present. The object of the present meeting was to report the progress which had been made since the shareholders last met, in accordance with the promise which was made at the meeting on June 30 last, that the shareholders should be called together and informed of what was going on. As he had stated, the number of shares subscribed for had not been sufficient, and it only remained to realise the property to the best advantage.

A short discussion ensued, and several gentlemen expressed their regret that, looking at the really good prospects of the mine, the shareholders had not come forward and taken up the remaining shares, because if this had been done there was every prospect of the company proving a success.

A vote of thanks was then passed to the Chairman, and the meeting broke up.

WEST TOLGUS MINING COMPANY.

The two-monthly meeting of shareholders was held at the mine on Wednesday, Mr. RICHARD TAYLOR presiding. The accounts showed an expenditure in labour cost for the eight weeks ending June, 1942*l.*; merchants' bills, 1070*l.*; charged on account of 13th month, 100*l.*; Harvey and Co. for new cylinder, &c., 158*l.*; dividend of 1*l.* per share made on that day 512*l.*: making a total of 3782*l.* On the other side, 593 tons of copper ore sold had realised 3584*l.*, or, after deducting lord's dues (89*l.*), 3495*l.*, and the balance from last account of 900*l.* increased the credits to 4395*l.*, which, after defraying all expenses, and paying a dividend that day of 1*l.* per share, leaves a present credit balance of 613*l.* to be carried forward. The agent's report shows the mine to be still very productive. One point is mentioned as producing 13 tons of ore per fathom. and another point 7 tons per fathom, worth 42*l.* per fathom. A dividend is ensured for the next meeting by the sale of ores already, which realised 3438*l.*, which the agents estimate will leave a profit of more than 500*l.* The agents reported:—The ores sold for the next account, after deducting dues, give a return of 3438*l.*, which we estimate will leave a profit of a little more than 500*l.* In relation to the profits which have been realised during the last twelve months, we think it right to call attention to the serious effect on the value of our returns which has been occasioned by the fall in the standard. The average price of the ores which we sold in September, 1875, was 1*l.* 6s. 8d. per ton more than ores of the same quality sold for on the 3rd inst., a difference which on our usual sales of 600 tons for two months amounts to about 800*l.*, causing a diminution of our profits to that extent.

The CHAIRMAN remarked that the mine was not falling off in value, the difference in the profits now and twelve months ago was owing to the drop in the copper standard; if the price now had been the same as at that time they would have made 1200*l.* profit in the last two months, and would have been able to give a dividend of 2*l.* per share.

PROVIDENCE.—At the meeting, on Aug. 15, the accounts showed a debit balance of 1200*l.* 15s. 8d. A call of 10s. per share was made. The purser (Mr. E. Trythall) explained that the quantity of tin sold was about the same as for the previous account, but the returns might be increased with a better price; the average price realised for the present account is about 10s. per ton less than for the previous four months. Capts. W. Hollow and Sam. Rogers reported that the No. 2 north lode has opened a valuable piece of tin ground for 20 fms. in length (taken away years since), and they think it a very important point to lay open. They have 48 tutworkmen and 44 tributers, at an average of 14s. in 1*l.*: together 92 men underground.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

The Belgian Minister of Public Works has decided to let contracts for iron sleepers and accessories required for laying 31 miles of line upon the Helf system. The adjudication will take place at Brussels on Sept. 20. The Belgian Government will also let contracts upon the same day for the supply of 2870 tons of steel rails without accessories, and 1100 tons of iron rails without accessories, to be delivered in 1876. The Belgian Government will further let contracts upon the same day for the supply of 5000 tons of iron rails without accessories, 10,000 tons of cast-steel rails without accessories, and 1170 tons of fish-plates, bolts, &c., to be delivered in the course of 1877. Contracts of this importance are likely, of course, to be eagerly grasped at by Belgian industrials under present circumstances. Contracts have been let for the delivery in nine lots of 45 turntables of 16 ft. diameter to the Belgian State Railways; the turntables are to be similar to those in use on the Northern of France Railway. Eight tenders are delivered, and the contract was obtained by MM. Carels, of Gand, who offered to supply the tables at 103*l.* 15s. each. It appears that about 4500 tons of forged or rolled iron were exported in 1874 from Belgium into Sweden. On the other hand, Belgium imported from Sweden 6000 tons of forged or rolled iron in the same year.

Business in copper has remained without activity at Paris, at the same time prices have slightly hardened. Chilian, in bars, delivered at Havre, has made 78*l.*; ditto, ordinary descriptions, 76*l.*; ditto, in ingots, 78*l.*; English tough cake, 78*l.*; and pure Corocoro minerals, 76*l.* per ton. The Marseilles copper market has remained without variation. The German copper markets have been a little more active. The Rotterdam tin market has remained nearly stationary. Although transactions have presented no great importance holders have maintained their prices, and offers to sell have been comparatively rare. Disposable Banca has been held at 43¼ fls. Billiton has found purchasers at 42½ fls. At Paris, Banca, Straits, and English have all been quoted at 78*l.* per ton. The German tin markets have been very quiet. Lead has rather hardened in price upon the Paris market. French lead, delivered at Paris, has made 21*l.* 12s. per ton; Spanish, delivered at Havre, 21*l.* 8s. per ton; English, delivered at Havre, 21*l.* 8s. per ton; and Belgian and German, delivered at Paris, 21*l.* 12s. per ton. The German lead markets have been rather feeble. The Paris zinc market has exhibited great firmness. Silesian zinc, delivered at Havre, has made 22*l.* 16s. per ton; and other good marks, delivered at Havre or Paris, have made 23*l.* 12s. per ton. The German zinc markets have continued firm, but there has not been very much business doing.

The French iron trade remains dull and languid, prices are about stationary, and the amount of business doing has not increased. The only current circumstance of interest has been a proposal made to the French National Assembly by a group of 21 members for the suppression of the tax of 5 per cent. levied on goods and mineral traffic on the French railways since the close of the Franco-German war. Merchants' iron has presented a good tone upon the French markets, merchants have been laying in supplies at Paris, and prices have hardened accordingly. Rails, iron for building purposes, and large plates continue, however, a good deal depressed. There are considerable stocks of pig on hand, and this circumstance has a tendency to depress quotations. Recent transactions in rails have indicated a fresh fall, although it had been hoped that the lowest price had been already reached. A revival is anticipated in affairs some day, but it is obvious that it must take some time to restore activity to an industry which has been so profoundly shaken as the French iron trade.

The French coal trade has been complaining of feeble quotations and comparatively insignificant sales, in consequence of a prolonged depression, which benefits no one. Working miners have had almost everywhere to submit to a reduction in their wages, and they are now threatened with a further reduction. Thus working hours are being shortened, and in some cases working operations are altogether suspended for one or two days per week. Exploratory works are, however, still being carried on at some points. The Prefect of the Nord has collected some interesting details on the progress of coal mining industry in that department last year. The Prefect shows that companies engaged in the coal trade in the department experienced last year considerable difficulty in disposing of their production, and the extraction did not by any means attains its possible maximum in consequence. In 1869 the production of coal in the Nord amounted to 2,476,116 tons; in 1870 to 2,417,897 tons; in 1871 to 2,716,428 tons; in 1872 to 3,226,707 tons; in 1873 to 3,437,540 tons; and in 1875 to 3,356,696 tons. The number of persons engaged in coal mining in the Nord in 1875 was 20,680, as compared with 20,302 in 1874. In 1869 the corresponding total was only 16,533. The production per miner averaged 208½ tons last year, as compared with 208 tons in 1874. The amount paid in wages in 1875 was 884,531*l.*, as compared with 844,967*l.* in 1874. The consumption of coal in the Nord in 1874 was 4,148,133 tons.

At an adjudication of contracts for coal required for the Belgian State railways, which took place a day or two since at Charleroi and Liége, the rates at which the contracts were let were nearly the same as those current at the last previous adjudication. Upon the whole the Charleroi basin appears to maintain its prices better than the Liége district. M. Van Scherfeuzeel Thim has reported upon the mineral industry of the province of Liége during 1875. It appears from the report that the production of coal in the province last year was 3,551,791 tons, or 21,016 tons more than the corresponding production of 1874. The value of the production was much less last year than in 1874, having been computed at 2,272,032*l.* for 1874, and at 2,025,119*l.* for 1875. The number of working miners in the province of Liége was 26,429 in 1875; 20,714 were employed below ground, and the remainder above ground. The average profit realised last year upon each ton of coal raised in the province of Liége was computed at only 9d. per ton, or less than half the corresponding profit for 1874. Some 41 mines were worked at a profit in the province last year, while 26 were worked at a loss. At the close of 1875 the stocks of coal existing in the province were computed at 84,957 tons. In 1875 302,720 tons of coal and 142,269 tons of coke were exported from the Liége bason.

The Allgemeine Zeitung remarks that of the various branches of the iron and steel trades in Rhineland and Westphalia the depression appears to be most extreme in the rolling works. As an indication of the state of affairs in this department of German industry, our Augsburg contemporary instances the recent sale by auction of the Gravenbroick Rolling Works, an extensive establishment, erected in 1872-3. These works have been disposed of for 4700*l.*—one-fifth of the cost. The purchaser will not again use them for the purpose for which they were erected. The Westphalian producers of rolled iron (adds our contemporary) have hitherto been able, in some instances, to export to Russia and Switzerland; but they have now entirely lost those markets, as England is able, owing to the cheaper freights by sea, to undersell Germany in Russia, whilst Switzerland obtains the greater part of her supplies of iron and steel manufactures most advantageously from the adjoining departments of the eastern part of France.

MINING AND METALLURGY AT THE AMERICAN INTERNATIONAL EXHIBITION—No. VI.*

INDIA.—The recent appendix to the title of Queen Victoria assumes additional importance by an inspection of the Indian exhibit in the International Exhibition, which, together with representations of the various industries and arts, includes a display of minerals and ores which amply repay examination.

The finest specimens of iron ores come from the southern portion of the Indian peninsula, bounded by the Coromandel and Malabar coasts, known as the Madras Presidency. They include magnetites, some sand closely resembling the Moisic sand described as forming a part of the Canadian exhibit, and a variety of hematites and chromic ores. One of the most valuable deposits in this Presidency is near Salem, where beds of magnetic ore from 50 to 100 ft. thick are traceable for miles. One hill has encircling it five distinct beds, from 20 to 50 ft in thickness.

From the Bengal Presidency, which is by far the largest division of India, occupying the heart of the peninsula, and extending upon both sides of the Bay of Bengal, there are magnetic ores, magnetic iron sands, hematites and bog iron ores. An analysis of a magnetite, of which it is claimed there are nearly half a million tons visible in one locality, gives 69 per cent. of metallic ore, 12-1000ths of 1 per cent. of sulphur, and 5-1000ths of 1 per cent. of phosphorus. A remarkably white clay iron ore is a peculiarity.

Iron buttons and bars made by the native primitive processes, and specimens of the celebrated Wootz steel, are interesting features. This Wootz steel has been quite an article of export from India into the neighbouring countries and to Persia, and formerly some to more modern countries. From it the Damascus blades were said to have been made. and wonderful properties were ascribed to it. Pieces of the native iron were placed in a crucible and melted, the heat being continued for an hour or more after melting. The furnaces were then luted with clay to keep out all air and allow the contents to cool until the following day, when the buttons, or "oolies," were sorted out into sizes suitable for daggers, spear heads, sword blades, &c.

A peculiar rock or ironstone called laterite, from Mysore, in Bengal is exhibited, the geological age of which seems to be in debate. It often contains 30 per cent. of iron, and when first mined is so soft as to be readily cut with a spade. Upon exposure it hardens, and is largely used for road dressings. Carefully selected specimens are also used for building purposes. Some good manganese ores are included in the minerals from Bengal. Iron in the Bombay Presidency is represented only by a couple of samples of hematite. The copper ores of India do not appear remarkable; some ordinary ores, principally carbonates, glance and malachite embrace the display. The lead ores are evidently more valuable, some of them containing over 60 per cent. of lead, with silver, copper, arsenic and antimony in various localities. Antimony must occur in abundance on the Chandra river, where it is claimed there is an extensive bed 20 feet thick of stibnite, which, if as good as the sample, will some time be a bonanza for the owners.

The control of tin mines seems to be strangely allotted in large proportion to Great Britain and her dependencies: we were not, therefore, surprised to see specimens of this ore exhibited in the Indian collection. The principal deposits appear to be in the Tenasserim provinces, on the eastern coast of the Bay of Bengal, although the ore is reported as found in several localities on the main peninsula. From the same neighbourhood the "harital" or arsenic, largely

* No. V. appeared in the *Mining Journal* of Aug. 19.

used in India, is exhibited by handsome samples of yellow orpiment by the side of pink crude arsenic from Madras. Graphite, native sulphur, and corundum—most of the latter from near Salem, in Madras—are shown with the other minerals. There are also some specimens of gold sand, but no comprehensive or notable display. The occurrence and working of alluvial and quartz gold is noticed in India, but the quantity is not great, and analyses of ores do not give promise of more than $6 or $7 a ton.

India lays claim to having 35,000 square miles of coal fields, and desires to take her place after the United States, China, Australia, and Russia as ranking fifth as to the area of her coal lands. The coal exhibited is of inferior quality; one specimen, containing 45 per cent. of fixed carbon, with the same amount of volatile matter, and 10 per cent. of ash; it is very seldom that a less percentage of ash exists, and in many instances it reaches 30 per cent. Among the limestones there is one called "kunkur," of which there is abundance. It is ordinarily concreted about fragments of wood, shells, &c., and averages—carbonate of calcium, 72 per cent.; silica, 15 per cent.; clay, 11 per cent. A saline effervescence, known as "reh," which seriously affects the fertility of the soil, is often noticed where the "kunkur" is found; it is composed of the sulphate and chloride of sodium, and is used to a considerable extent in the manufacture of alum.

Among other features of the Indian collection are steatite, gypsum, mica, petroleum, rock salt, nitre, and a varied collection of clays and earths. These latter embrace fire-clay, pottery clay, porcelain clay, china clay, pipe clay, white, pink, yellow and red earths, red and yellow ochres, &c., and are evidently of more than average quality, the colours and homogeneity of some of them being exceptionally good.

A superior relief map of the Empire is of material service in studying the localities of the various minerals exhibited, but the scale is too small to obtain anything like definite information, for in this map, which is less than 2 ft. square, is included the Empire of India, with an area of over 1,500,000 square miles. A series of maps illustrating the surveys of India, unfortunately, are folded and locked in the cases. Information respecting this interesting country, whose civilisation and industries can be traced for centuries, will be welcome to many of us who, in watching the rapid strides made by our own land, have been too unmindful of the people, resources, and physical features of other nations. With its natural wealth and dense population (more than five times the number of inhabitants in the United States reside there upon an area of less than half as great as ours), there should be an industrial future before this land of the Hindoo. Indicative of the march of improvement, there are at present 6300 miles of railroads in India, which is in excess of the length of lines in operation in either Canada or Australasia. The knowledge that the area of India is 13 per cent. of the territory over which the British flag floats, and that it is inhabited by 86 per cent. of those who entirely or partially bear allegiance to "the Crown," gives to the title of "Empress of India" a deep significance.—*Iron Age* (New York).

THE NEW ROUTE TO THE CONTINENT.

Just three years ago the desirability of establishing a new route to the East by way of Flushing and Germany was pointed out by our esteemed correspondent Mr. W. T. MULVANY, of Dusseldorf, and although the project did not at first appear to be fully appreciated by the public, at least in this country, the line is now in full operation so far as communication with Holland, Belgium, and Germany is concerned, and has proved an unquestionable success. If the service be not already so remunerative to those who have provided it as some of the old-established routes, it is already so well patronised as to give the best possible promise of a brilliant future, more especially as the comfort and economy of the route are such that no one can use it without being induced to recommend it to their friends. In these days of hurry, when even pleasure must be taken at a high speed and for as small an outlay as possible, the Queenborough and Flushing route offers advantages possessed by no other for visitors to the Rhine and Switzerland, as well as to Belgium and Holland. As an evidence of this the time and cost to reach Cologne by the two quickest routes may be compared. Travelling by what is usually designated the Short Sea Express route—by the South-Eastern or London, Chatham, and Dover lines in England, and through France and Belgium on the other side—the first-class single through fare is 2*l.* 10s. 9d., the tourist leaving London shortly after 8 o'clock in the evening, being shipped at Dover about half-past 10, and reaching Cologne at about 4 o'clock on the following afternoon. The train for tourists by the Flushing route leaves Ludgate Hill in the evening 25 minutes later than the Dover train, and Cologne is reached at 40 minutes past 4 on the following afternoon, but the fare first-class single is but 2*l.* 7s. 4d., and a return ticket, which is not obtainable by the Dover route, can be had for 3*l.* 16s. 2d., or for only 5s. 5d. more than the single ticket by the old route, the return ticket, moreover, being available for two months. The only question, then, is the relative comfort of the two routes, and here again the Flushing route certainly loses nothing by the comparison.

The character of the first-class carriages of the London, Chatham, and Dover Railway, in which the journey from London to Queenborough is performed, need not be referred too; they are certainly equal to any in this country. Queenborough is reached in an hour and a-half, and there one of the beautiful vessels of the Stoomvaartmaatschappij Zeeland is ready to receive the traveller. On the night when the writer crossed, a few weeks since, the vessel provided was the Stad Middelburg—a large and handsome vessel, comparable to some of the best on the Atlantic lines, and making up about 150 beds—the sister ship, Stad Vlissingen, which runs the alternate journeys, is in every respect similar. The first thing to be done on board is to apply to the officers for a cabin, for which no extra charge is made, and as they are allotted in order of application the first comer is best served, though it must be said that all the cabins are excellent, and from the large amount of accomodation no passenger runs the risk of being put into a cabin with a stranger. Having taken possession of his new home, the tourist can return to the saloon, where an excellent supper and good wine are provided at reasonable prices; after doing justice to this and "walking a mile" on deck, he will be quite ready to turn into bed and sleep soundly. By this time he will have reached the Nore; and it may here be observed that from the much larger size of the vessels and the absence of the chopping sea, there is much less chance of sea-sickness than on the passage from Dover to Calais; so apparent is this that many delicate ladies who suffer much on the Channel passage perform the trip from Queenborough to Flushing without inconvenience. Flushing is reached by eight o'clock the following morning, and the traveller, instead of being jaded and depressed with almost constant railway travelling, has had the benefit of as good a night's rest as he could obtain in a first-class hotel, a good wash, an an excellent meat breakfast, so that he is well prepared for the Custom House examination at Flushing, and at half-past nine he starts on his railway journey to Cologne.

Beyond Cologne the cost and speed will, of course, be the same whatever route has been passed over from England, and the tourist may choose tours on the Rhine, in the Black Forest, or in Switzerland, as he may think fit; but in either case he will probably proceed along the Rhine by rail to Mayence, Darmstadt, Worms, Ludwigshafen, Heidelberg, and Carlsruhe. Thence for the Black Forest he will take Offenburg, Hausach, Hornburg, Freiburg, Villingen, Donau-Eschingen, Enger, Singen, and Constance, whence he will return to Cologne, and so get back to England. Or from Cologne he could go to Aix-la-Chapelle, Herbesthal, Pepinster, Liége, Louvain, Brussels, and Antwerp, proceeding thence by train to Roosendaal, where the Cologne train to Flushing will take him up, though by this means he will lose his returns between Cologne and Roosendaal. If he desire to extend his tour to Switzerland he can either proceed from Constance direct to whatever part he may select or return to Appenweier, and thence to Offenburg, Freiburg, Muhlheim, and Basle, or Olten, where he will be well in the district of the Swiss circular tours, which are very cheap, and full particulars of which will be found in the official "Cursbuch," obtainable at any of the railway stations for a few pence. The beautiful lakes and passes in Switzerland having been sufficiently examined, the tourist can return from Basle to either Cologne or Roosendaal by way of Strasburg, Metz, Luxemburg, Arlon, Jemelle, and Brussels, and will go over but little of the same ground twice, and will have been enabled to see a great deal without loss of time, and at a comparatively small cost. There is doubtless a large field for the tourist agents to establish circular systems, including Holland and Belgium *via* Queenborough and Flushing, and the Rhine and Switzerland *via* Flushing on the outward journey, and returning from Switzerland *via* Paris and Normandy, or Brittany, the homeward passage being made from Dieppe to Newhaven, or from St. Malo to Southampton. But for such tours to be practicable and profitable it is essential that the French railways should adopt the same liberal scale for tourists traffic which has proved so remunerative on the Flushing and Venlo line, and which is so rapidly popularising the route.

THE ASCENT OF STEEP RAILWAY GRADIENTS BY LOCOMOTIVES.

An interesting and valuable series of experiments has just been carried out on the High Peak Railway, of the London and North Western Company, in Derbyshire. The object was to test the practicability of working heavy traffic on steep gradients by Mr. Henry Handyside's method of conducting the traffic up steep inclines by locomotives, instead of by stationary engines. The inventor for many years held the office of Assistant Provincial Engineer to the Government of Nelson, New Zealand. The conditions of the development of this enterprising colony impressed him with the necessity of providing railways at a greatly less cost than is required to construct the even tracts which are insisted on for the main lines of this country, and the first condition clearly was to be able to work the traffic with considerably steeper gradients. Sacrificing the speed of expresses at sixty miles an hour, and being content with a more moderate though still quick rate of transit, and possessing the means of ascending and descending inclines with safety, with slight interruption to the speed of the journey, and without any serious addition to the cost, it is evident that the field of the locomotive and the railway might be enormously extended. They might, therefore, with these conditions fulfilled, traverse districts which are very hilly, and where a gradient of one in 70 or 80 would mean an enormous cost of construction, could profitably be introduced into parts of the country where the trade and the population would not give a dividend on the cost of an ordinary railway, and could particularly be rendered available to convey mineral products, as stone, lime, &c., from the mountainous parts of the country, where they are generally found. Our main lines of railway have been made, but the feeders have yet to be constructed, and these wait only for the proof that they can be built at a low cost, on which the smaller traffic would suffice to pay an adequate dividend. In countries whose population is small, and whose export productions are mainly agricultural, such cheap railway systems would widen the area of profitable cultivation, and render natural resources available which are now worthless for want of the means of transit. It is the soberist of estimates to say that, let it be once shown that good working railways can be laid down at 4000*l.* or 5000*l.* a mile, a few years would see the length of railway lines in the world doubled.

This is the problem which Mr. Handyside has set himself to solve, convinced that all existing methods are essentially imperfect. The distinguishing feature of his system is to fix the locomotive to the rails; and, for the ascent of the incline, to convert it into a stationary engine. His plan was explained in a paper read at the meeting of the British Association at Bristol last year, and published as a pamphlet, and was for several weeks at work in the conveyance of material out of the basin of the New Avonmouth Dock at Bristol. The construction is simple. At the back of the locomotive a horizontal drum is fixed, round which a steel wire-rope is coiled. The drum is rotated by separate cylinders, and in the one used in the experiments to be described the revolution was produced internally by what is known as the sun and planet motion, but this is no necessary part of the invention.

On each side of the engine framing is suspended a self-acting gripping strut. These, when pressed by levers, clasp the sides of the rail firmly, and so fix the engine in its position and render it stationary. The engine is of light construction, which involves a saving in the weight to be moved, and in the weight of rail and general construction of the permanent way; but the essential novelty is the use of an effective brake to give great power in arresting speed in the descent, and particularly in fixing the engine in the ascent, then turning the steam into the cylinders which produce the revolution of the drum, and drawing up the load by the steel wire-rope. The new method has been successfully tested by models, and by its practical application in hauling at the Avonmouth Docks, at the latter on a gradient of 1 in 10. But what was needed to prove its complete applicability to railway work was that it should perform the actual traffic of a line of railway.

A specially favourable opportunity for the application of this test has been placed at the disposal of the inventor and his partners in the enterprise by the courtesy of the London and North-Western Railway Company. They are the proprietors of the High Peak Railway. This, as its name indicates, traverses the summits of the ridge which forms the western watershed of the Derwent and the Wye, and separates their valleys from that of the Dove. It starts from Cromford, on the right bank of the Derwent, not far from Ambergate. It rises to the foot of the Black Rock by a gradient of 1 in 8, and, passing over the road from Wirksworth to Cromford, again ascends an incline to Middleton of 1 in 10. It proceeds from that point on the level to the foot of the Hopton incline, which is ¼ mile long, and has a gradient of 1 in 14. Thence there is a long stretch of 12 miles on the summit of the hills to the incline at Shallcross, which has a gradient of 1 in 10 or 11. The line joins the North-Western Railway proper beyond Buxton. This is one of the oldest railways in the kingdom, having been constructed in 1826 as a horse tramway, but it has for some years been worked by locomotives, with stationary engines for the inclines. In addition to the main line there are several sidings. The line is single, and does not carry passengers, the principal freights being limestone, the fine Hopton paving stone got near Wirksworth, and other building stones. The traffic on the line is considerable, though it is not regarded as a profitable part of the London and North-Western system.

The incline chosen to test the power of Mr. Handyside's system is that at Hopton, at the head of the famous Via Gellia. It is ordinarily worked by the balance system, which is convenient at a colliery or a quarry on an eminence, where full trucks go down and empty ones up, but as part of the line for a miscellaneous traffic it often involves a good deal of waiting to secure a down-load to balance the up-load. A long ¾-in. endless chain, passing over iron pulleys, derives its motion from the drum attached to a double stationary engine of great power placed on the top of the incline. The wear is evidently heavy, and the weight and friction of the long chain add greatly to the work of the engine. For the last three weeks Mr. Handyside, with his brother-in-law, Major Haverfield, have been superintending the working of the traffic by the new system, which has been done with perfect ease. The London and North-Western Company have had time-keepers to note the work done and the time occupied, and one of their principal engineers, Mr. Footner, has carefully watched the working of the new system. On Thursday, after the ordinary day's work had been done, some hours were devoted to experimental trips with successful results, but we prefer describing what we saw and noted on Friday. A line of light rails, 54 lbs. to the yard, has been laid on unballasted sleepers without chairs. The head of the rails is thicker than usual, but the shank and foot are light, and the rail is of course not reversible. The work does not appear in the least to have disturbed or injured the rails.

The mode of ascending the incline was as follows:—The engine was coupled at the siding to three trucks loaded with limestone, or iron chairs or rails, and weighing without the engine, which is 22 tons, about 35 tons. The train ran along a quarter of a mile of level line to the foot of the incline. Here, without any loss of time, the engine was uncoupled, the trucks remained stationary, and the engine ran up the incline at the rate of about 25 miles an hour, paying out the steel wire rope from the drum, that having been previously fastened to the front truck. Having ascended half way the engine stopped, the grippers were dropped on and clasped the rails, and the steam was turned into the cylinders which worked the drum. The three trucks were then rapidly drawn up by the rope, and as soon as they reached the engine a strut at the rear was dropped, which firmly supported them, the engine ran to the top of the incline, was again fixed to the rails, and drew the trucks up to the top, was coupled to them, and drew them away to a siding, and then ran down the incline without any necessity for the application of the brake grippers, fetched three more trucks, and repeated the operation.

The special timed work done on Friday was to convey 18 trucks loaded with stone and iron, and weighed by the London and North-Western Company, from the Middleton siding to the top of the Hopton incline. The whole weight without the engine was 190 tons. The engine reached the loaded trucks at the siding at 34 minutes 40 seconds after one o'clock. The trucks were taken up three at a time, and the whole 18 were raised to the top of the incline, and all but the last shunted into a siding, at 13 m. 15 s. after Three o'clock, so that the whole work occupied 1 h. 38 m. 35 s. Of this time, however, 17 m. 43 s. were taken up by traversing the level part of the line to the foot of the incline, which formed no part of the work to be done as compared with that of a stationary engine. Again the men stopped to take in water, from not having first filled the boiler, and that occupied 6 m. 57 s. Deducting these two items, the actual time taken to raise 190 tons up an incline a quarter of a mile long, on a gradient of 1 in 14, and, therefore, rising 100 ft., was 1 h. 13 m. 55 s. The time was thus occupied:—

	Hrs.	ms.	scs.	
Traversing level line	0	17	43	
Ascending incline	0	40	48	
Descending incline	0	8	33	
Shunting at top	0	16	59	
Coupling at foot and once shunting to clear a siding	0	7	35	Hrs. ms. scs.
Taking in water	0	6	57	= 1 38 35

From what we know of the working of a stationary engine, which only raises one loaded truck at once, we believe the work was done in less time than that would occupy without deductions, but in that case there must have been a locomotive at the foot to drag the trucks to the incline, and one at the top to shunt and to carry them forward. In the case of the locomotive tried on Friday, it did all the work itself, and the train was shunted, ready to be coupled to the last three trucks, and proceeded on its journey. The average time occupied in each ascent was rather under six minutes five seconds, and the engine only once took over a minute and a half to go down, that being when the driver stopped to grease. Two of the descents were made in a minute and a quarter each, and there was no necessity to apply the brake. The engine previously took seven loaded trucks down to complete the load at the siding, four at one descent and three at another. The brakes were on the trucks, but it was not necessary to apply the engine brake, and they went down quite steadily. Supposing that the engine had been drawing a load of three trucks, weighing, as one lot of these did, 37½ tons, not having to separate them it would only have occupied six minutes and five seconds in the ascent of 100 ft., and in traversing a quarter of a mile, which would have been an almost unappreciable interruption for the incline. Had the load been six trucks, the time, with once coupling and shunting, would not have exceeded 15½ minutes, and supposing the ordinary speed on the level to be at the rate of 20 miles an hour, the loss of time would be a quarter of an hour for the incline, as compared with a perfectly level surface. A light passenger train, such as would traverse a line of this character, would not require division, so that the interruption on ascending the incline would be very slight.

On Saturday the engine took a train of 27 loaded trucks, weighing 280 tons, from the top of the Hopton incline to Hurdlow—a distance of 12 miles, stopping at five places and shunting on the way. It traversed the whole distance in 2 hours 53 minutes, consuming 500 gallons of water and 5 cwts. of coal. It took 12 wagons, 10 of which were loaded with a total weight of 120 tons, up the incline at Hurdlow, which is 1¼ mile long, and has a gradient of 1 in 60, and made the ascent easily without the rope. It descended the incline and got back back to Hopton in 3 hours 55 minutes from the time it had started from the latter place. It was then supplied with water, went down the incline, fetched up seven loaded wagons in two draws, waited for the down train, and took that train of nine wagons, weighing 90 tons, at once down the incline and on to Middleton.

We have stated the facts with as little comment as possible, and they go far to prove that Mr. Handyside has shown the railway world how to construct cheap railways, and he is hardly extravagant in stating that with his mode of traversing inclines railways may be made in any part of the country at 4000*l.* a mile. If that be so, the area of steam locomotion may be indefinitely extended, and the traffic on the main lines increased by the construction of numerous feeders across districts which would not pay for an expensive even-graded line.

This method of ascending and descending inclines may prove of great advantage in warlike operations, and the War Office so thoroughly appreciates the importance of the experiments that the Royal Engineer Committee on Field Railways will visit Hopton to report on the sytem early next month.—*Derby Reporter* (Aug. 25).

DEEP SINKING FOR COAL AT PEREMBA IN UPPER SILESIA*.

The author describes the progress made in the sinking of three pits for a new winning called the Queen Louisa Colliery, near Gleiwitz. The object is to work a large mineral field, measuring 3½ miles long by ⅝ mile broad, containing 10 workable seams of coal with a total thickness of 100 ft., and estimated to contain 120,000,000 tons of available coal. The thickest seam, which is also the lowest, known as the "Pochhammer Flötz," is about 21 ft. thick, and is expected to be reached at 455 yards below the surface, the strata having a tolerably rapid dip of from 10° to 15° from the known workings towards the new pits.

It was originally intended to sink only two pits, one 17 feet and the other 11½ ft. in diameter, the former to be used as a downcast and engine pit, and the latter as an upcast and for travelling purposes. To supply coal for the use of the sinking engines from the seam first intersected, provisional drawing arrangements were established in a division of No. II. pit; but as the drawing of coal simultaneously with the continuance of the sinking was found to be inconvenient and dangerous, a third pit is to be added for winning the shallower seams, the position being located by a bore-hole put down by the Diamond Boring Company to a depth of 290 yards. The larger, No. II., pit was intended to have two large pumping-engines at the surface, but it has been decided to use a pair of Ommaney's direct-acting steam-pumps and engine instead. The distance between the centres of the two pits is only about 22 yards, so that they may be easily brought into communication with each other in the event of nifficulties arising during the sinking.

The sinking of the No. I. pit was commenced in September, 1869, below the main adit, about 44 yards from the surface, in a loose sand known to the Upper Silesian miner as Kurzawka; the uppermost bed of the coal measures being reached at 18 yards deeper. The work was stopped by the outbreak of the war with France in July, 1870, when a depth of 72 yards had been reached. In October, 1871, it was resumed, and in November, 1874, had reached 216 yards. For 153 yards downwards the pit is walled with brickwork, carried at intervals upon five cast-iron wedging cribs. At 203 yards a sixth crib was put in and a seventh at the bottom, and the whole depth below the fifth crib (63 yards) was lined with cast-iron tubbing to keep back a strong feeder of water at the level of the second or Veronica seam. The tubbing is in 87 rings, each 20·4 inches high, and cast in eight segments; the thickness of the metal is about 1 in. (25 millimetres), and it is capable of resisting a pressure of 787 ft. of water. The total weight of metal in the two sets of tubbing, including cribs, valves and relief pipes, is 341·75 tons (metrical), which was built into position in 87 days. The average cost per running yard of tubbing was about 52*l.* 4s. 6d., or about four times as much as walling with two rings of brickwork, including the necessary cast-iron cribs. The walling has been carried out in hard-burnt (clinker) bricks of a segmental shape, which possess considerable advantages over the ordinary rectangular bricks used at first. The sinking of No. II. pit, begun in February, 1870, was, like the former, stopped by the war, and was resumed in 1871, the Veronica seam being reached at 145 yards at the end of 1873. In October, 1874, the American method of sinking with the Diamond boring machine was adopted, and it is intended to carry the shaft 260 feet deeper, when a cross-cut will be driven to No. I. pit. The water from the latter will then be lifted to the surface by a 16-inch lift in No. II., attached to the permanent winding engines, so that the sinking of No. I. may be continued without interruption to the deep seam, which is expected to be reached at 460 yards, the sinking lift having only to pump from a depth of 219 yards.

The permanent winding engines at No. I. pit are a pair of horizontal direct-acting construction, about 250-horse power, having cylinders 37 in. in diameter, and 6 ft. 2 in. stroke, with an average piston speed of 308 feet per minute. During the sinking they are used for driving the pumps. Similar engines are supplied to No. II., and a somewhat smaller pair to No. III. pit, to be used during the sinking for pumping purposes. The sinking pumps, 17·3 inches in diameter, are worked principally by the main drawing engines by sweep rods and bell crank. They are described in detail, but have no special peculiarities, except an arrangement for shifting the clacks when the door-piece is drowned. At first packed pump buckets were used, but as these were worn out in six hours with sandy water, they have been replaced by others with hydraulic leathers, which are found to work from 20 to 30, or in favourable cases 36, days without renewal.

A fixed lift was first put in at 95 yards, but since the completion of the tubbing it has been replaced by a Tangye pump, which takes the water directly from the sinking lift and raises it to the adit. In the highest seam now laid out for working a Cameron's special pump is used to force water to the surface, where it is used for feeding the boilers.

The permanent drawing arrangements proposed are two four-tub double-decked cages in No. I. pit, and four similar cages in No. II. pit, the former with wire-rope and the latter with rail guides; the total quantity of coals drawn is 1,000,000 tons per annum, or 3000 tons per day. For supplying steam to the numerous engines above and below ground, 32 Cornish boilers of so-called "normal" dimensions (? 50 HP.) will be required.

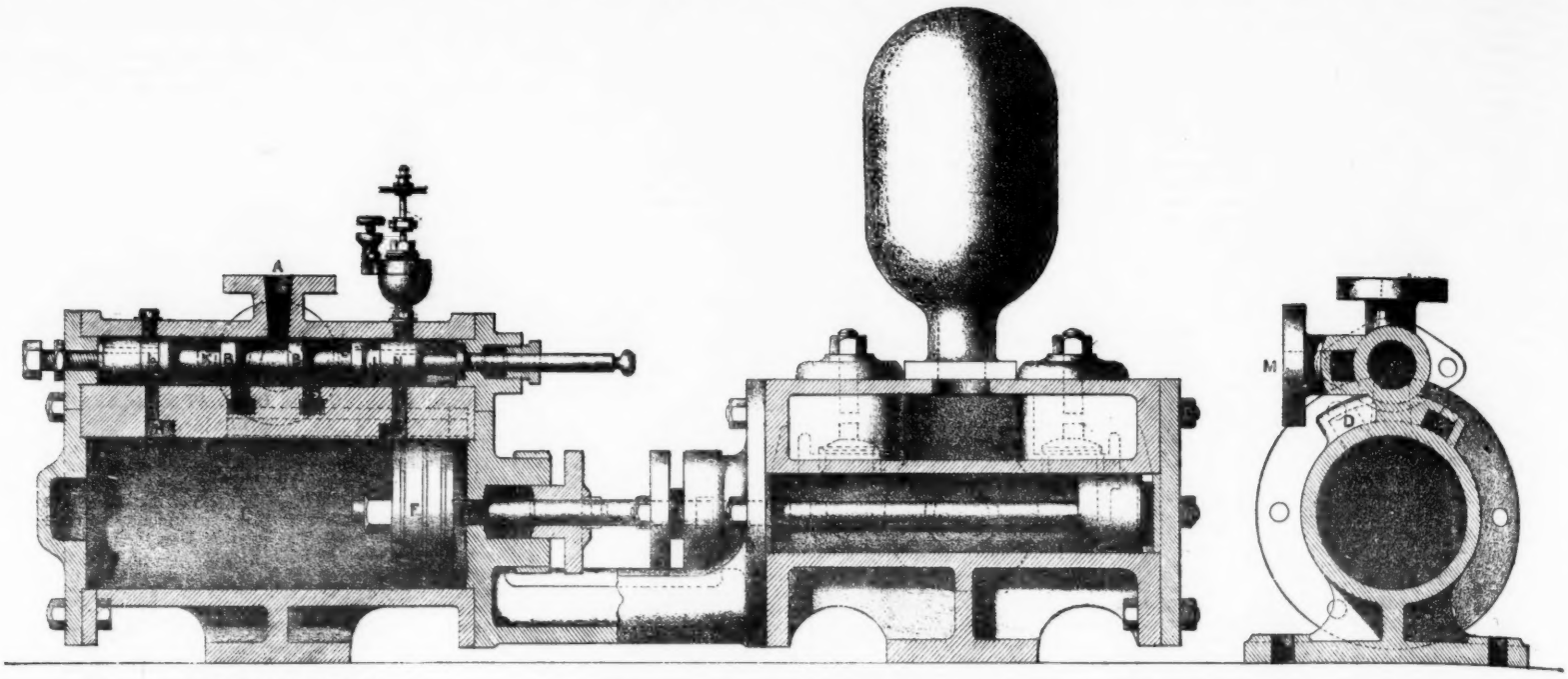
— H. SCHANTZ, Zeitschrift für Berg-, Hütten-und Salinenwesen.

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals, for the Proceedings of the Institution of Civil Engineers."

Mr. J. W. JUDD, has been appointed Lecturer on Geology in the Royal School of Mines in succession to Prof. Ramsay, whose retirement we noticed a few weeks ago. Mr. Judd was for several years an officer on the staff of the Geological Survey, and in that capacity worked out the structure of parts of Lincolnshire and adjacent counties. After resigning this appointment, in order to devote himself to original research, he contributed to the publications of the Survey a valuable memoir on the Geology of Rutland. His numerous writings on Scottish geology, on volcanic phenomena, and on other geological subjects have justly acquired for Mr. Judd a high scientific reputation.

We regret to hear that ill-health has compelled Dr. THOMAS OLDHAM to resign the directorship of the Geological Survey of India, an appointment which he has held since 1851. In the Records of the Geological Survey of India, Part II., for 1876, just received, in a notice of Dr. Oldham's retirement, occurs the following passage:—"Dr. Oldham has repeatedly received very high testimony from the scientific world. To appreciate fully what he has effected, one should have experience of the position, where every means, material and personal, had to be formed or imported. . . . Due honour paid to the intelligent liberality of the Government of India, it is to Dr. Oldham, whether as superintendent of the Geological Survey, or as President of the Asiatic Society of Bengal, more than to any other man, that Calcutta owes the magnificent museum building it can now boast of." Dr. Oldham will be succeeded by Mr. H. B. Medlicott, and the vacancy left by this gentleman's promotion will be filled by Mr. R. B. Foote. Dr. Oldham is at present in this country, and Mr. Medlicott is expected here shortly.—*Athenæum.*

THE CALEDONIAN PUMP.



THE CALEDONIAN PUMP.

The steam-pump herewith illustrated, and introduced to the engineering markets under the name of the Caledonian Pump, is constructed by Messrs. A. F. CRAIG and Co., of Paisley. Its chief characteristic over other similar direct double-acting piston pumps consists in the arrangement of the steam and jet ports, which is as follows:—As soon as the steam has entered by the pipe, A, and passed between the two rings of the valve, B B, it is admitted to the cylinder, C, through the ports, D E. The valve is shifted by the piston, F, uncovering the jet ports, G H, and allowing the steam to act on the ends of the valve alternately through the small holes in the annular spars, I and J, the exhaust all taking place through the ports, K L, and pipe, M, in the side of valve chamber. In the position shown, the piston, F, is at the forward end of its stroke, and has uncovered the jet port, G, and shifted the valve to the back end of its stroke, and has opened the main steam port, D, admitting steam to the front end of the cylinder, C (the main steam ports being crossed), and exhausted through the port, E, and exhaust port, L. The steam that has shifted the valve is also exhausted through the port L, the annular space, J, being brought over the port, and remains open, the jet port, G, being close to the cylinder by the hollow part, N, while the other end of the valve is in position to receive steam through the jet port, H, and annular space I, when the piston uncovers the jet port, H, on arriving at the termination of its stroke back. The valve is cushioned by the exhaust steam being allowed to get behind the valve through the small holes, O, shown by dotted lines; these holes also serve to exhaust more quickly, and allow the pump to run at a high speed. Messrs. Craig and Co. have run these Caledonian Pumps at 200 ft. per minute down to 20 ft., with equal certainty of action, and with no knocking of the valve.

As to the advantages claimed by the makers over other pumps in use, it is said to occupy less space than other pump of equal capacity, the length of cylinder with ordinary piston being the same as usual for any other steam-engine of the same stroke. Its essential moving parts are reduced to two in number, being the ordinary piston and steam-valve; no tappet-valves or tappet gearing are required. The steam-valve is cushioned by the exhaust steam at each end of the stroke, thus its action is rendered noiseless as well as harmless, since there is no concussion or knocking of the valves or other parts. The pump valves are all easily accessible, it being only necessary to unfasten one bolt for examination or repair or each. The Caledonian Pump can be started at any point of its stroke, and is fitted with an air vessel, steam stop-valve, lubricator, and pit cocks. Our illustration shows a longitudinal section and a transverse section through the steam cylinder.

THE DARLINGTON BORER—SHAFT-SINKING STAND.

We understand that the Compressing and Rock Boring Machinery erected some months ago at the Minera Mines have proved thoroughly efficient and satisfactory. The compressing engine cylinders, air receivers, and shaft-sinking stand were made at the Sandycroft Foundry, Chester, an establishment specially devoted to the construction of the most improved mining machinery of every type and class.

The twin air-compressing engines have cylinders 10½ inches diameter and 30 inches stroke. The air cylinders coupled direct to the steam cylinders are 10 inches diameter. The speed of the engines and compressors may be varied from 8 to 40 strokes per minute.

The egg-end receiver is 18 feet long, 3 feet diameter; the air pipes, extending down the shaft about 200 yards deep, are 3 in. diameter.

The stand on which the borers are mounted is shown in Fig. 1. It consists of a long vertical bar, 12 feet long, fitted with two radial arms, a boring machine being placed on each arm.

For boring purposes the stand is dropped to the bottom of the shaft, the vertical bar clamped to a "dividing" piece, and the arms fixed to the wall of the shaft. When the boring is completed the stand is hoisted a sufficient distance from the bottom beyond the effects of the blast. The holes are bored radially from the centre of the shaft, or in parallel lines, as it may be desirable.

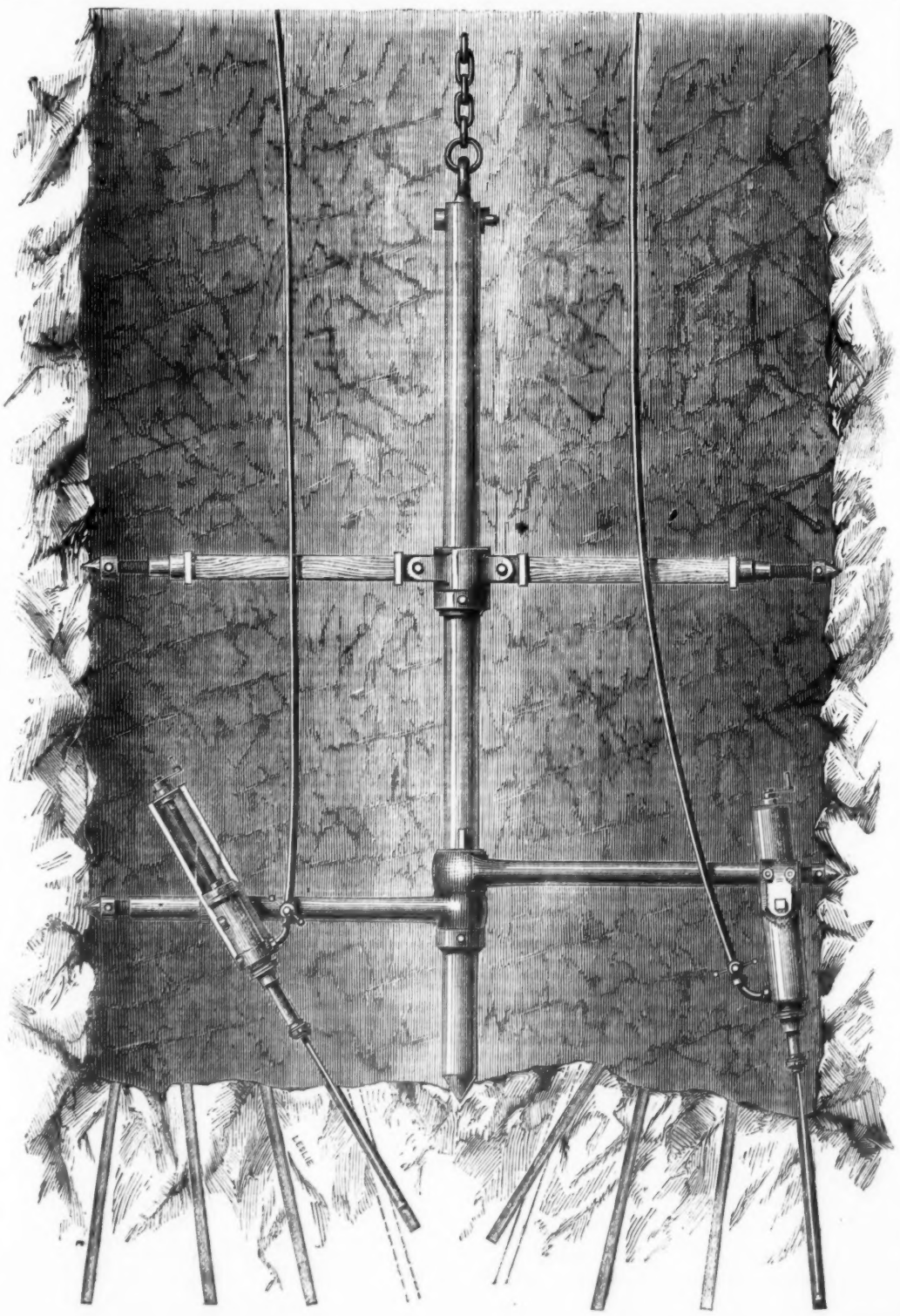
If radial the centre or sump holes, three or four in number, are about 3 ft. apart, and inclined towards each other at an angle sufficient to ensure the removal of the stuff when fired. The shaft now complete 8½ ft. in diameter required from 30 to 32 holes to sweep it to a depth of 2 ft. The ground in the shaft consisted of a wide lode divided by heads of rock running in every direction, vughs or openings, strings of hard close-grained quartz associated with silicious limestone, with occasional strings and blotches of lead and blende ores. Altogether a most difficult and uncertain rock to bore in, and one very trying even to the experienced miner.

In no instance, however, did the Darlington Borers fail to do their work, holes where bored with as much facility as if the machines were a simple substitute for the common borer, bar and mallet Two machines were sometimes employed, at other times one was only used. The rate of boring varied considerably.

In ordinary limestone from 5 to 6 in. per minute; in close fine-grained quartz from 2 to 3 in.; the maximum depth of hole was 3 ft. the common depth about 26 in. The whole of the holes were blasted electrically by one of Bornhardt's machines, Abegg's electric fuses being employed for igniting the charges. The hindrances which occurred in sinking the shaft were exceedingly numerous, but none of them were in any way attributable to the boring machines or boring tackle.

The general result was that the shaft was sunk three times faster than it could have been accomplished by hand labour alone. It is now intended to drive a long cross-cut from the bottom of the shaft with two Darlington Borers mounted on a carriage to blast electrically, and to push forward the work with all vigour. In sinking the shaft no boring machines are kept in reserve, nor did any appear to be necessary, one marked characteristic of the work being the absence of expensive or tedious repairs. The machines were most successfully handled by two intelligent Cornishmen, who had never seen a machine borer until the Darlington Borer was put into their hands. The Darlington Borer will shortly be working at the Royal and Ducal Mines of Rammelsberg-bei-Goslar.

DARLINGTON BORER—SHAFT-SINKING STAND.



SEA WATER FOR LONDON.—The difficulty with regard to pipes having been urged as an objection to the suggestion for bringing Brighton sea water direct to London, it may not be uninteresting to mention that a far larger project of a similar character is about to be carried out in America. The Pennsylvanian Transportation Company has obtained a charter for the purpose of transporting oil from the oil regions to the principal Atlantic seaboard cities. The plan proposed is to run the oil through a 4-in. pipe laid on the surface; the forcing power will be 900 lbs. to the square inch; there are to be stations at distances of 15 miles, at each of which an engine of 100-horse power will be erected to work a pump to continue the flow from point to point. The company having decided upon the construction of the work, the president sought the services of General Herman Haupt. He pronounced the scheme, after a thorough examination, to be entirely practicable, and is now acting as engineer-in-chief. In view of the enormous product of oil in America—30,000 barrels per day—and the rank it now holds among the leading articles of export, coupled with the exorbitant charges for railroad carriage from the wells to the seaboard, by the completion of the enterprise and its successful operation, a complete revolution will be accomplished in the handling of this article. As a proof of how valuable this traffic has been to the several railroads over which the oil has been borne, it is only necessary to say that up to the present time the railroad charges aggregate $79,000,000. The minimum cost of transporting oil by rail is 50 c. per barrel, and the minimum cost by the pipe process is 16 c. The average charge by rail is $1¼. The estimated cost of the entire work, including fixtures, &c., is $1,250,000, and considering the difference in cost between this method and that by rail, upon the hypothesis that the company will discount at least 25 c. a barrel on rail rates, it will readily be seen that, with all the expenses of operating, the first year's earnings will pay the first cost of the work.

BLAKE'S PATENT STEAM PUMP.

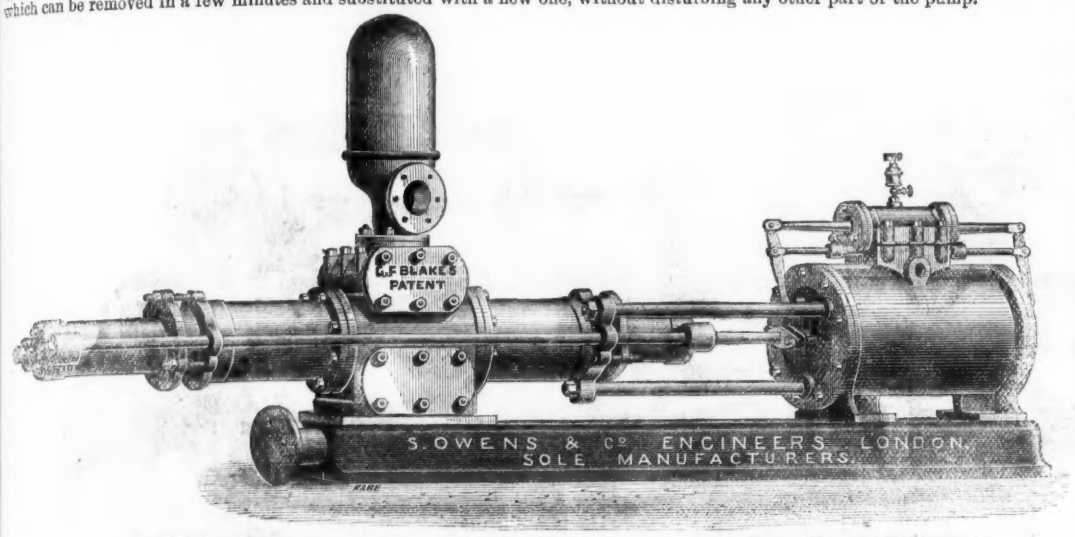
MORE THAN 8000 IN USE.

SOLE MAKERS FOR GREAT BRITAIN,

S. OWENS & CO.,

Hydraulic and General Engineers, Whitefriars-street, London; And at 195, Buchanan-street, Glasgow (W. HUME, AGENT).

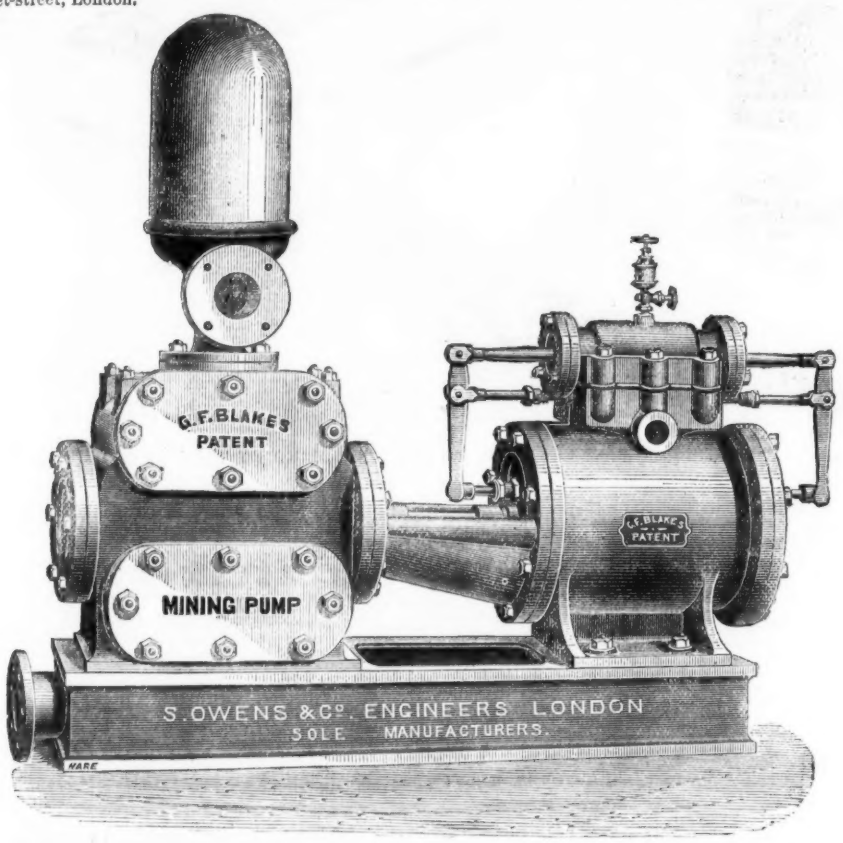
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.

S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

By combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Dia. of steam cylinders.. In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	18	20	20	20	20	24	24
Dia. of water cylinders.. In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	8	9	6	8
Length of stroke ..... In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	30	36	36	36	42
No. of strokes per minute..	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	20	17	17	17	15
Quantity in gallons per hour, approxmately ...	1440	2610	4200	5940	2940	4620	6600	2646	4158	5940	10620	2646	5160	7500	13260	4586	9000	12360	15660	6720	20

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION.

PATENT CONDENSORS

Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

The Blake Pump will work under water, and as efficiently with compressed air as with steam.

BLAKE'S DONKEY PUMPS FOR FEEDING BOILERS KEPT IN STOCK.

THE TAVISTOCK IRONWORKS, ENGINEWORKS FOUNDRY, AND HAMMER MILLS,

TAVISTOCK, DEVON.

NICHOLLS MATHEWS, AND CO.

ENGINEERS, BRASS AND IRON FOUNDERS, BOILER MAKERS AND SMITHS.

MAKERS OF

CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.

Also of SPUR, MORTICE, MITRE, BEVIL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means.

MACHINERY or FOREIGN MINES carefully prepared.

SECONDHAND MINING MACHINERY, in good conditon, always on sale at moderate prices.

BICKFORD'S PATENT SAFETY FUSE,

FOR CONVEYING FIRE TO THE CHARGE IN BLASTING ROCKS, &c

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at he "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869: TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES of SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

JOHN AND EDWIN WRIGHT,

PATENTEES.

(ESTABLISHED 1770.)

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPES

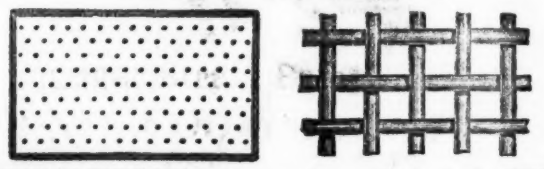
from the very best quality of charcoal iron and steel wire.

PATENT FLAT AND ROUND HEMP ROPES,

SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES (made from Wedster and Horsfall' patent steel wire), HEMP, FLAX, ENGINE YARN, COTTON WASTE TARPAULING, OIL SHEETS, BRATTICE CLOTHS, &c.

UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.
UNIVERSE WORKS, GARRISON STREET, BIRMINGHAM.
CITY OFFICE, No. 5. LEADENHALL STREET, LONDON, E.

STRONG WIREWORK.



STRONG WIREWORK, the cross wires equally bent; also BEST STAMP GRATES, both of iron and copper, and punched copper plates. DITTO TUBBED. All the above promptly supplied at

W. ESCOTT'S MINING MATERIAL DEPOT,
TAVISTOCK, DEVON.

FOREIGN ORDERS PROMPTLY EXECUTED.

WILTON'S MATHEMATICAL INSTRUMENT ESTABLISHMENT, REMOVED from St. Day to A. JEFFERY'S, CAMBORNE.

W. H. WILTON begs to thank his friends for their liberal support for so many years, and informs them that (having opened business at Valparaiso) he has now declined business in England in favour solely of Mr. A. JEFFERY, MATHEMATICAL INSTRUMENT MAKER, CAMBORNE, whom he considers (having been an assistant to his father for several years) is in every way capable of creditably maintaining the good name universally awarded to Wilton's instruments.

A. JEFFERY

Respectfully begs to inform Mine Managers, Surveyors, Engineers, &c., the having purchased Mr. Wilton's business, and the very valuable acquisitions and appliances belonging thereto, he has enlarged his Mathematical Instrument Manufactory, and is prepared to supply THEODOLITES, DIALS, POCKET DIALS, LEVELS, TRAVERSING and PLAIN PROTRACTORS, CASES OF DRAWING INSTRUMENTS, MEASURING CHAINS and TAPES, ASSAYERS' SCALES and WEIGHTS, ENGINE COUNTERS, and, in short, every description of Instruments used in SURVEYING, MEASURING, MAPPING, &c.

Repairing in all its branches promptly attended to.

MAPS OF THE MINES, AND OF UTAH TERRITORY.

FROISETH'S NEW AND REVISED MAP FOR 1875.—Size 40 by 56 inches, scale 8 miles to the inch. Handsomely engraved, coloured in counties, showing the Towns, Settlements, Rivers, Lakes, Railroads, Mining Districts, &c., throughout the Territory, and all the Government Surveys to date. Mounted on cloth, £2; half-mounted, £1 12s.; pocket form, £1.

Also, GENERAL MINING MAP OF UTAH, showing twenty-eight of the principal Mining Districts adjacent to Salt Lake City, and location of the most prominent mines. Price, pocket form, 6s.

Also, NEW MAP OF LITTLE AND BIG COTTONWOOD MINING DISTRICTS, showing the location of over Four Hundred Mines and Tunnel Sites, together with the Mines Surveyed for United States Patent. Price, sheets, 6s.; pocket form, 8s.

For sale, and supplied by—

TRUBNER and Co., 57 and 59, Ludgate Hill, London; or
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Now ready, price 3s., by post 3s. 3d., Sixth Edition; Twentieth Thousand Copies much improved, and enlarged to nearly 300 pages.

HOPTON'S CONVERSATIONS ON MINES, between Father and Son. The additions to the work are near 80 pages of useful information, principally questions and answers, with a view to assist applicants intending to pass an examination as mine managers, together with tables, rules of measurement, and other information on the moving and propelling power of ventilation, a subject which has caused so much controversy.

The following few testimonials, out of hundreds in Mr. Hopton's possession speak to the value of the work:—

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VIENNA EXHIBITION, 1873.

LONDON EXHIBITION, 1874.

CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

TANGYE BROTHERS AND HOLMAN,

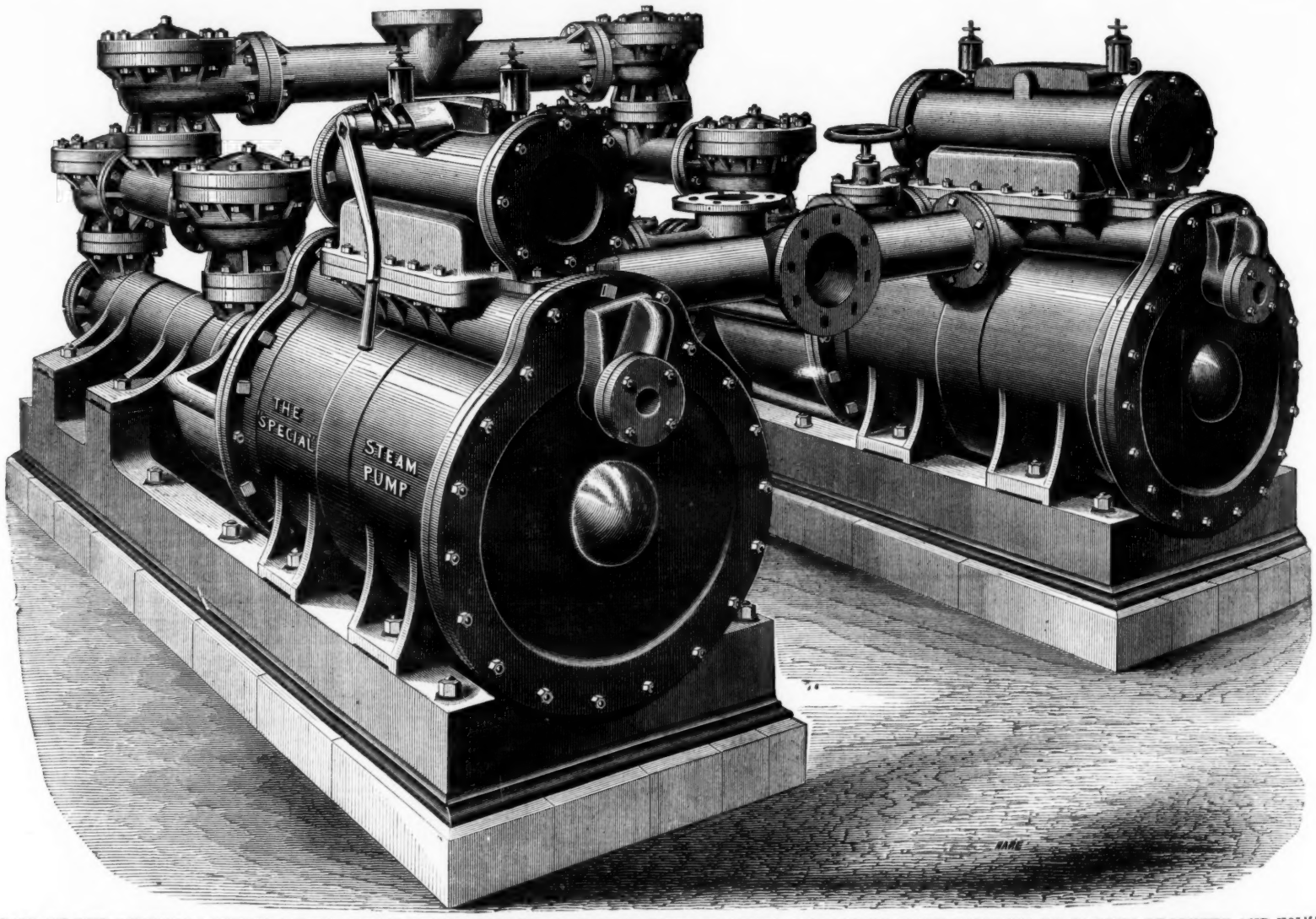
10, LAURENCE POUNTNEY LANE, LONDON, E.C.,

AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO

THE "SPECIAL" DIRECT-ACTING STEAM PUMP.

OVER 12,000 IN USE.

SUCCESSFULLY ADOPTED IN A LARGE NUMBER OF MINES IN THIS COUNTRY AND ABROAD.



PAIR OF THE "SPECIAL" DIRECT-ACTING STEAM PUMPS SUITABLE FOR HIGH LIFTS IN MINES, SIMILAR TO MANY SUPPLIED BY TANGYE BROTHERS AND HOLMAN.

The following extracts from a letter, received by Tangye Brothers and Holman, from J. Bigland, Esq., dated Feb. 25, 1875, refers to a "Special" Direct-acting Steam Pumping Engine supplied four years ago to Messrs. Joseph Pease and Partners, for the Adelaide Colliery, Bishop Auckland. The engine is throwing about 8000 gallons per hour, 1040 feet high, in one direct lift:—

"The underground pumping engine at Adelaide Colliery is working night and day. It does its work satisfactorily, and gives us very little trouble. Some of the cup leathers which form the plunger packing have worked three months. The working barrel is in beautiful condition. The average duration of the valve seats is about eight months; they work and keep tight as long as there is a bit of them left. I expect the valves (Holman's patent) and the buffers will last as long as the colliery."

Extract from a letter received by Tangye Brothers and Holman from W. H. Eagland, Esq., dated Feb. 27, 1875, in reference to a "Special" Direct-acting Steam Pumping Engine supplied two years ago to the West Yorkshire Iron and Coal Company near Leeds, to throw 16,000 gallons per hour, 465 feet high in one direct lift:—

"It is at work night and day. Our man goes down to the pump twice a day (Ten A.M. and Four P.M.), to supply the tallow cups. After this it is left every day till he comes next morning, when he goes down again at Ten A.M. as before. The only repairs the pump has had for 12 months are one bucket, which had worked since we got the pump, and one valve seat, but no valve, so it has cost very little. Its first lift is 70 yards perpendicular, then the water passes up pipes for half a mile, ascending another 70 yards, and then another perpendicular pipe of 15 yards —total, 55 yards vertical height.."

Extract from the Official Report of the Commission of the German Empire on the Vienna Exhibition of the 1873, treating on Pumping Engines:—

"Contrary to these older pumping engines exhibited, there is now nearly everywhere the opinion established that the ('SPECIAL') pumping engines placed underground, which are made on A. S. Cameron's principle by Messrs. Tangye, are preferable to all. They do much duty combined with great compactness. They dispense entirely with the troublesome rod arrangement, giving often rise to explosions, so that they will be applied shortly to a great extent, and are already in use in many localities. There is no doubt that this is in every respect practical system will command a general adaptation."

200 SIZES AND COMBINATIONS OF THESE PUMPS ARE NOW MADE.

The following are a few of the Sizes for High Lifts in Mines:—

Diameter of Steam Cylinder .....In.	7	8	9	9	10	10	12	12	12	14	14	14	16	16	16	16	18	18	18	18	21	21	2
Ditto of Water Cylinder .....In.	3	3	3	4	3	4	3	4	5	4	5	6	4	5	6	7	5	6	7	8	5	6	7
Length of stroke.....In.	24	24	24	24	36	24	36	36	36	36	36	36	36	36	36	36	48	36	36	36	48	48	36
Gallons per hour approximate	1830	1830	1830	3250	1830	3250	1830	3250	5070	3250	5070	7330	3250	5070	7330	9750	5070	7330	9750	13,000	5070	7330	9750
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump	325	425	540	300	665	375	960	540	345	735	470	330	960	615	426	312	775	540	400	300	1058	740	560

CONTINUED.

Diameter of Steam Cylinder .....In.	21	21	21	24	24	24	24	24	26	26	26	26	26	30	30	30	30	30	32	32	32	32	36
Ditto of Water Cylinder .....In.	8	9	10	6	7	8	9	10	7	8	9	10	12	8	9	10	12	14	8	9	10	12	14
Length of stroke.....In.	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	9750	13,000	16,519	20,000	30,000	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump	413	326	264	960	700	540	427	345	827	633	500	405	282	840	665	540	375	275	960	758	625	426	313

PRICES OF THE ABOVE ON APPLICATION.—FOR SIZES AND PRICES OF PUMPS FOR LOWER LIFTS SEE SEPARATE LIST.

HOLMAN'S PATENT CONDENSER will be found a great acquisition to all kinds of Steam Pumps, as not only is the exhaust steam completely condensed, and the annoyance from same blowing off entirely got rid of, but a vacuum is obtained in the steam cylinder saving from 20 to 50 per cent. in fuel, and increasing to a considerable extent the economy and efficiency of the Pump.

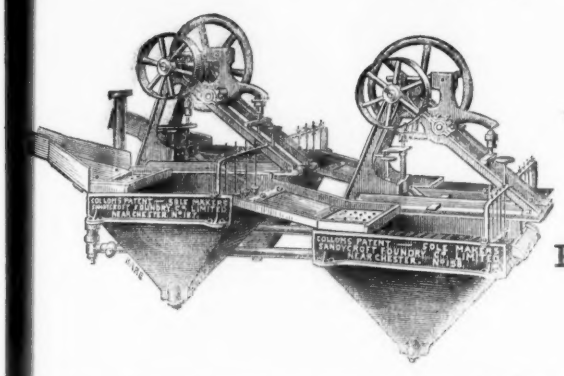
NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... ... ... TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

PATENT IMPROVED ORE WASHING & DRESSING MACHINES.

THE SANDYCROFT FOUNDRY & ENGINE WORKS CO. (LIMITED), NEAR CHESTER

LATE THE MOLD FOUNDRY CO. (ESTABLISHED 1838).

SOLE MAKERS IN GREAT BRITAIN.



HUNDREDS IN USE.

FULL PARTICULARS,
PHOTOGRAPHS, TESTIMONIALS, AND PRICES,
UPON APPLICATION.

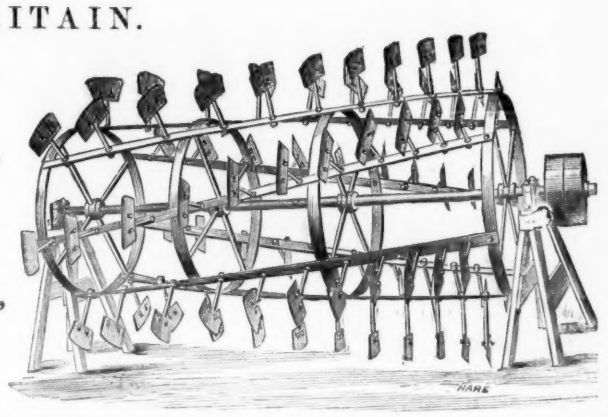
Will supply Designs, and all the necessary Plant for laying out Dressing Floors; also

MANUFACTURERS OF EVERY VARIETY OF

MINING MACHINERY,

PUMPING & WINDING ENGINES,

PITWORK, CRUSHING MILLS,
ROLLS
OF PECULIARLY HARD AND TOUGH MIXTURE
&c., &c.



COLLOM'S PATENT AUTOMATIC ORE WASHING MACHINE, working at the following and many other Lead, Copper, Blende, and Tin Mines:—Great Laxey, Cape Copper, Pontgibaud, Linares, Alamillos, West Tolgus, Lisburne, Minera Halvans, Snailbeach, &c.; and also at Messrs. Vivian and Sons' Works, Swansea.

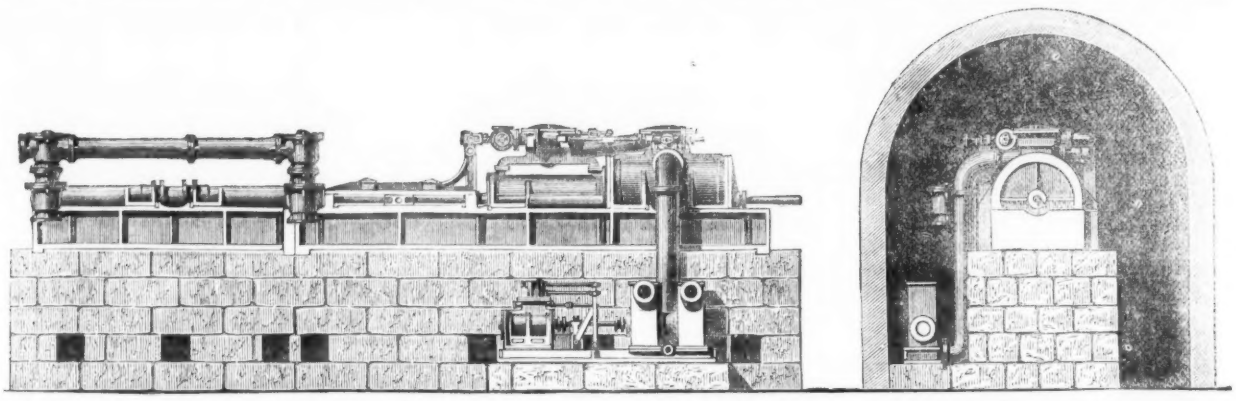
PATENT IMPELLER, OR KNIFE BUDDLE, in use at the following and many other Lead, Copper, Blende, and Tin Mines:—The Van, Roman Gravels, Tankerville, Ladywell, Lisburne, East Black Craig, Old Treburgett, Penhale & Barton, Bog, Linares, Fortuna, Alamillos, Minera Halvans, &c.

LONDON OFFICE: 6, QUEEN STREET PLACE, E.C.

HATHORN, DAVIS, CAMPBELL, AND DAVEY,

MAKERS OF

The Differential Pumping Engine, Hydraulic Pumping Engines, Cornish Engines, Differential Blowing Engines, Compound Rotative Engines, the Separate Condenser, Hydraulic Machinery, Mining Plant of all kinds, and Machinery for Water Supply, Irrigation, &c.

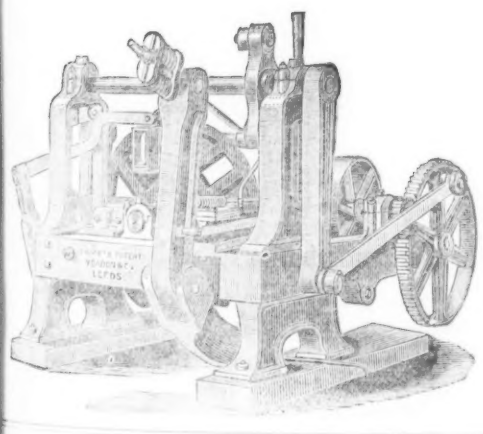


THE COMPOUND DIFFERENTIAL ENGINE AND FORCE PUMPS,

With Separate Condenser, as applied Underground, forcing 700 gallons per minute 920 feet high.

SUN FOUNDRY, LEEDS.

FURTHER PARTICULARS ON APPLICATION



EMMET'S

A1 PATENT BRICK MACHINE.

Massive; durable; cheap; takes little power, and gives PERFECT SATISFACTION.

This is the ONLY Machine which presses the Brick equally on BOTH sides, each plunger entering the mould plate ⅝ in., and turning out 12,000 SQUARE, SOLID, PRESSED Bricks per day, READY AT ONCE FOR THE KILN.

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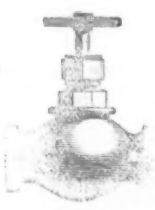

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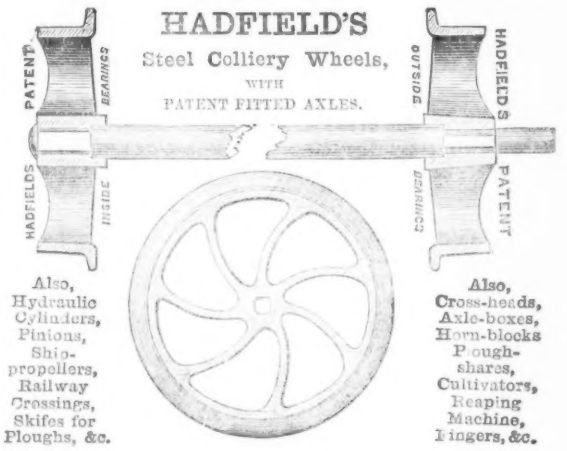

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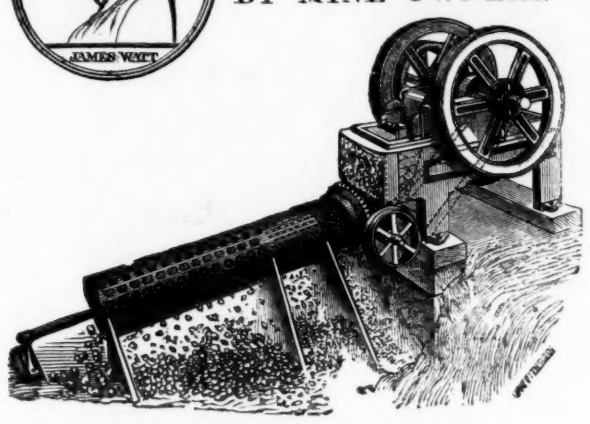

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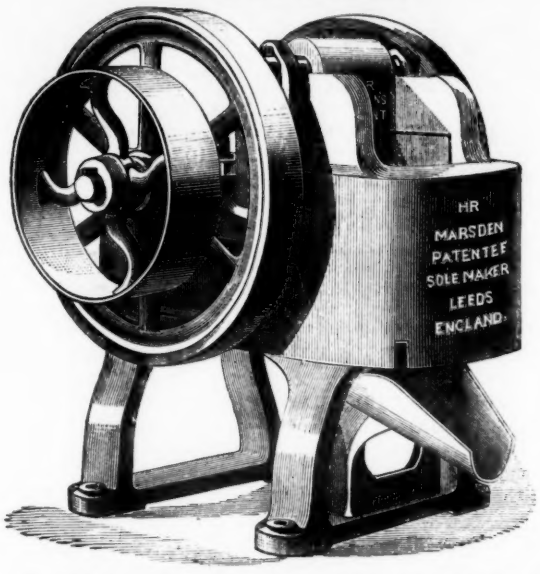

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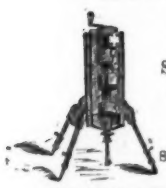

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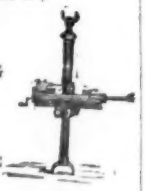

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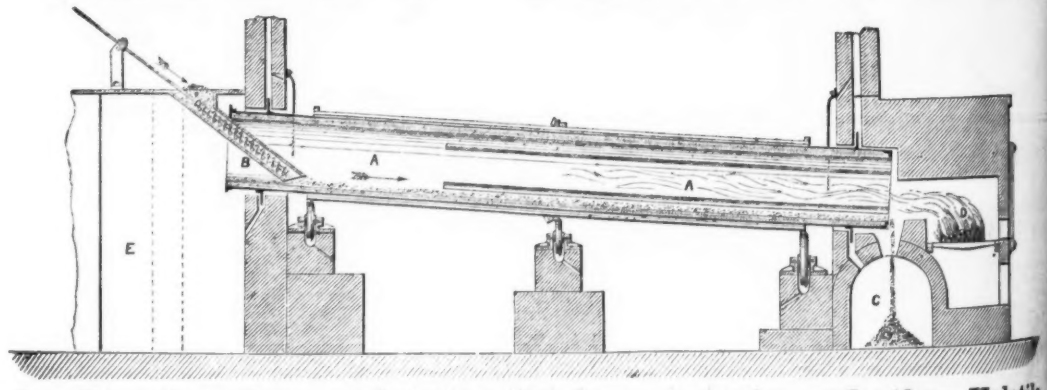

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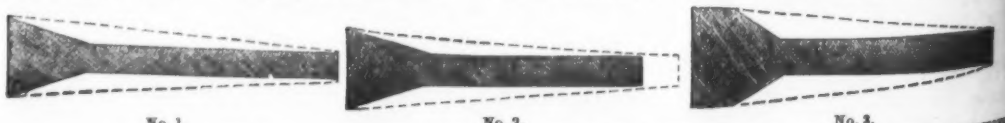

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